



Gujarat Secondary and Higher Secondary Education Board, Gandhinagar

# BIOLOGY



Guiding Question Bank (MCQ) for  
Preparation of NEET Examination

Price  
₹ 125/-

Secretary  
Gujarat Secondary and Higher Secondary Education Board  
Sector 10-B, Near Old Sachivalaya, Gandhinagar-382 010.



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Secondary Education Board,  
Gandhinagar**

**QUESTION BANK  
BIOLOGY**

**Price : 125 `**

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Gandhinagar**

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# PREFACE

Uptil now , the Students had to appear in various entrance examinations for engineering and medical courses after std-12. The burden of examinations on the side of the students was increasing day-by-day. For alleviating this difficulty faced by the students, from the current year, the Ministry of Human Resource Development , Government of India, has Introduced a system of examination covering whole country. For entrance to engineering colleges, JEE(Main) and JEE(Advanced) examinations will be held by the CBSE. The Government of Gujarat has except the new system and has decided to follow the examinations to be held by the CBSE.

Necessary information pertaining to the proposed JEE (Main) and JEE(Advanced) examination is available on CBSE website [www.cbse.nic.in](http://www.cbse.nic.in) and it is requested that the parents and students may visit this website and obtain latest information – guidance and prepare for the proposed examination accordingly. The detailed information about the syllabus of the proposed examination, method of entrances in the examination /centers/ places/cities of the examinations etc. is available on the said website. You are requested to go through the same carefully. The information booklet in Gujarati for JEE( Main) examination booklet has been brought out by the Board for Students and the beneficiaries and a copy of this has been already sent to all the schools of the state. You are requested to take full advantage of the same also However, it is very essential to visit the above CBSE website from time to time for the latest information – guidance . An humble effort has been made by the Gujarat secondary and Higher Secondary Education Boards, Gandhinagar for JEE and NEET examinations considering the demands of the students and parents , a question bank has been prepared by the expert teachers of the science stream in the state. The MCQ type Objective questions in this Question Bank will provide best guidance to the students and we hope that it will be helpful for the JEE and NEET examinations.

It may please be noted that this “Question Bank” is only for the guidance of the Students and it is not a necessary to believe that questions given in it will be asked in the examinations. This Question Bank is only for the guidance and practice of the Students. We hope that this Question Bank will be useful and guiding for the Students appearing in JEE and NEET entrance examinations. We have taken all the care to make this Question Bank error free, however, if any error or omission is found, you are requested to refer to the text – books.

**Date: 02/01/2013**

**M.I. Joshi**  
**Secretary**

**R.R. Varsani (IAS)**  
**Chairman**

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## Unit -I

### Chapter-1. Classification of Living Organisms

#### IMPORTANT POINTS

Nature is formed by nonliving and living organisms. One who has life and performs biological processes and manifests to environment is called living organism. Living organism possess certain characters like-reproduction, growth, development, reaction with environment adaptation and death. Besides these it has characteristics like metabolism, entropy, efficiency to maintain heredity. It produces new generation through reproduction. Energy is required during metabolism. Growth is a out put of metabolism. Quantity increases due to growth. Tissues and organs are formed due to differentiation and organogenesis occurs during development living organism shows efficiency of manifestations of feeling towards environment. It obtains adaptations to sustain in an environment and creates variations for adaptation. New species is created due to variation, hence biodiversity forms. It has efficiency to maintain heredity before its death.

There is an aggregation of different layers in living organisms. Membranes are formed of large molecules and molecules are formed from atoms. Cell is formed by membranous organelles. Tissue is constituted by group of cells which are present in organ and organ system. Body is composed by such organ systems. Such living organism is known as species. Population is structured by group of species. Such combined population of a same habitat form a biotic community. By interaction between biotic community and environment is constituted an ecosystem. By composition of ecosystems biosphere is constituted.

The study of living organisms can be done by nomenclature and identification characters. Living organisms are classified in to groups. Meaningfully called classification which has species, genus, order, family, class, phylum and kingdom. There are certain rules and regulations. Many scientist's have contributed in this field. There are various sources for study.

**From the given options select the correct option (a, b, c, d) Each carries one mark.**

- In taxonomic classification the correct sequence is ..... (CBSC-92)
  - class-family-tribe-order-genus-species
  - class-order-family-tribe-genus-species
  - tribe-order-family-genus-species
  - class-tribe-order-family-genus-species
- The smallest taxon amongst following is .....(PMT-94)
  - class
  - order
  - species
  - genus
- Taxonomically a species is ..... (PMT-94)
  - A group of evolutionary related population
  - A fundamental unit in the phylogeny of organisms
  - Classical evolutionary taxonomy
  - A community taken into consideration as an evolutionary base

4. Species is ..... (CBSC-94)
  - (A) not related to evolution
  - (B) specific class of evolution
  - (C) specific unit of evolution
  - (D) fertile specific unit in the evolutionary history of a race
5. Two words comprising the binomial nomenclature are ..... (DPMT-96)
  - (A) Family & genus
  - (B) order & family
  - (C) genus & species
  - (D) species & variety
6. A group of plants or animals with similar traits of any rank is kept under ..... (PMT-96)
  - (A) species
  - (B) genus
  - (C) order
  - (D) taxon
7. Which of the following is the correct sequence in the increasing order of complexity ? (PMT-97)
  - (A) molecules, tissues, community, population
  - (B) cell, tissues, community, population
  - (C) tissues, organisms, population, community
  - (D) molecules, tissues, community, cells
8. The correct sequence of taxonomic categories is .....
  - (A) class-phylum-tribe-order-family-genus-species
  - (B) phylum-order-class-tribe-family-genus-species
  - (C) division-class-order-family-tribe-genus-species
  - (D) division-class-family-tribe-order-genus-species
9. The total words in binomial nomenclature are ..... (PMT-97)
  - (A) 5
  - (B) 3
  - (C) 2
  - (D) 4
10. New systematic and the concept of life was given by (BHU-98)
  - (A) Huxley
  - (B) Odom
  - (C) Elton
  - (D) Linnaeus
11. Two organisms of same class but different families will be kept under the same (CET-98)
  - (A) genera
  - (B) species
  - (C) order
  - (D) family
12. Which of the following will form a new species ? (PMT-98)
  - (A) inter breeding
  - (B) variations
  - (C) differential reproduction
  - (D) none of the above
13. A community includes ..... (CET-98)
  - (A) a group of same genera
  - (B) a group of same population
  - (C) a group of individuals from same species
  - (D) different populations interacting with each other
14. One of the following cannot be called a taxon ..... (PMT-98)
  - (A) order
  - (B) family
  - (C) genus
  - (D) none of the above
15. Binomial nomenclature was given by ..... (BHU-97)
  - (A) Huxley
  - (B) Ray
  - (C) Darwin
  - (D) Linnaeus
16. In classification the category below the level of family is ..... (CET-98)
  - (A) class
  - (B) species
  - (C) phylum
  - (D) genus

17. Which is the lowest level of organization in the living kingdoms ? (CET-98)  
 (A) molecular level      (B) cellular level      (C) population      (D) tissue level
18. Growth in plant is ..... (pmt-99)  
 (A) limited      (B) life long      (C) diffusable      (D) unlocalized
19. First botanist to give binomial nomenclature was ..... (WARDHA-2000)  
 (A) Baubin      (B) Aristotle      (C) Linnaeus      (D) Hutchinson
20. Taxon is ..... (CET-2000)  
 (A) species      (B) unit of classification  
 (C) highest rank in classification      (D) group of closely related
21. One of the following includes most closely linked organisms (PMT-2001)  
 (A) species      (B) genus      (C) family      (D) class
22. Which of the following taxons cover a greater number of organisms ? (PMT-2001)  
 (A) order      (B) family      (C) genus      (D) phylum
23. Inbreeding is possible between two members of ..... (AMU-2005)  
 (A) order      (B) family      (C) genus      (D) species
24. Which of these is correct order of hierarchy ? (WARDHA-2002)  
 (A) kingdom, division, phylum genus & species  
 (B) phylum, division, genus & class  
 (C) kingdom, genus, class, phylum & division  
 (D) phylum, kingdom, genus, species & class
25. Which is not a unit of taxonomic category ? (BVP-2002)  
 (A) series      (B) glumaceae      (C) class      (D) phylum
26. Which is the first step of taxonomy ? (MGIMS-2002)  
 (A) nomenclature      (B) classification  
 (C) identification      (D) hierarchical arrangement
27. The five kingdom classification was given by ..... (BYP-2002)  
 (A) Whittaker      (B) Linnaeus      (C) Copeland      (D) Haeckel
28. In taxonomy, class comes in between ..... (CET-2002)  
 (A) kingdom and order      (B) phylum and order  
 (C) kingdom and family      (D) family and genus
29. Taxon includes ..... (PMT-2002)  
 (A) Genus and species      (B) kingdom and division  
 (C) all ranks of hierarchy      (D) none of the above
30. Binomial nomenclature refers to ..... (CET-2000)  
 (A) Two names of a species  
 (B) one specific and one local name of a species  
 (C) two words for the name of a species  
 (D) two life cycles of an organism



31. Carl Linnaeus is famous for ..... (GGSPU-2002)  
 (A) coining the term 'systematics' (B) introducing binomial nomenclature  
 (C) giving all natural system of classification (D) all of these
32. True species are ..... (CBSE-2002)  
 (A) interbreeding (B) sharing the same niche  
 (C) feeding on the same food (D) reproductively isolated
33. The smallest unit of classification is ..... (GGSPU-2002)  
 (A) species (B) sub-species (C) class (D) genus
34. Who coined the term 'taxonomy' ? (BVP-2003)  
 (A) Candolle (B) Waksman (C) Leuwenhoek (D) Louis Pasteur
35. Basic unit of classification of organisms is ..... (CET-2003)  
 (A) species (B) population (C) class (D) family
36. The unit of classification containing concrete biological entities is ..... (WARDHA-2003)  
 (A) taxon (B) species (C) category (D) order
37. Species are considered as ..... (CBSE-2003)  
 (A) real basic units of classification (B) the lowest units of classification  
 (C) artificial concept of human mind which cannot be defined in absolute terms  
 (D) real units of classification devised by taxonomists
38. The living organisms can be unexceptionally distinguished from the non-living things on the basis of their ability for ..... (CBSE-2007).  
 (A) interaction with the environment and progressive evolution  
 (B) reproduction  
 (C) growth and movement  
 (D) responsiveness to touch
39. Two plants can be conclusively said to belong to the same species if they .....(CBSE-2007)  
 (A) have more than 90% similar genes  
 (B) look similar and possess identical secondary metabolites  
 (C) have same number of chromosomes  
 (D) can reproduce freely with each other and form seeds
40. Natural system of classification given by ..... (UP-PMT-2009)  
 (A) Linnaeus (B) Hutchinson (C) Bentham & Hooker(D) Haeckel
41. Huxley is a father of which systematic ? (HARYANA-2009)  
 (A) new systematic (B) artificial systematic  
 (C) evolutionary systematic (D) natural systematic
42. The smallest unit of living organism is ..... (AIPMT-2003)  
 (A) DNA (B) RNA (C) cell (D) protein
43. How many obligate categories are there? (BHU-06)  
 (A) 3 (B) 5 (C) 7 (D) 9

44. True name is ..... (MANIPAL-2001)  
 (A) APIS Indica (B) mangifera Indica  
 (C) MANGIFERA INDICA (D) Mangifera indica
45. Maize is a ..... (CBSE-09)  
 (A) taxon (B) category (C) series (D) species
46. Taxonomic category arrange in descending order ..... (MH-01)  
 (A) key (B) hierarchy (C) taxon (D) taxonomic category
47. Common name and genus are same in ..... (PMT-07)  
 (A) Mangifera (B) Zia (C) Rana (D) Gorilla
48. Assertion (A) To give a scientific name of a plant there is ICBN Reason.  
 (R) they have articles, photographs and recommendation to name a plant (PMT-2000)  
 (A) A and R both is correct and R is correct explanation to A  
 (B) A is true but R is false  
 (C) A and R both correct but R is not correct explanation to A  
 (D) both are false
49. Hierarchical classification means \_\_\_\_\_ .  
 (A) To divide division into classes (B) To divide classes into orders  
 (C) To divide orders into families (D) To rank things one above the other
50. Assertion (A) Taxon and category are same.  
 Reason (R) Category shows hierarchical classification.  
 (A) A and R both are correct and R is a correct explanation of A  
 (B) A and R both are correct and R is not a correct explanation of A  
 (C) A is true and R is false  
 (D) A is false but R is true
51. Assertion (A) The hierarchy includes seven obligate categories.  
 Reason (R) Intermediate categories are used to make taxonomic positions more informative  
 (A) A and R both are correct and R is a correct explanation of A  
 (B) A and R both are correct but R is not a correct explanation of A  
 (C) A is true and R is false  
 (D) If both are false  
 (e) A is false but R is true
52. Assertion (A) Death is a meaningful event.  
 Reason (R) The number of living individuals of each species remains limited through death and components of body further turn to environment  
 (A) A and R both are true and R is a correct explanation of A  
 (B) A and R both are true but R is not a correct explanation of A  
 (C) A is true and R is wrong  
 (D) A is wrong and R is true

53. Assertion (A) If the ratio of anabolic process is more than catabolic process, growth occurs  
Reason (R) Growth is an out-put of metabolism.
- (A) A and R both are true and R is a correct explanation of A  
(B) A and R both are true but R is not a correct explanation of A  
(C) A is true and R is wrong  
(D) A is wrong and R is true
54. Assertion (A) Members of the same species can't do copulation.  
Reason (R) Zygote is produced as a result of fertilization.
- (A) A and R both are true and R is a correct explanation of A  
(B) A and R both are true and R is not a correct explanation of A  
(C) A is true and R is wrong  
(D) A is wrong and R is true
55. Assertion (A) Energy transformation also takes place in metabolism in living organism.  
Reason (R) Organism have to perform many biological activities.
- (A) A and R both are true and R is a correct explanation of A  
(B) A and R both are true and R is not a correct explanation of A  
(C) A is true and R is wrong  
(D) A is wrong and R is true
56. Assertion (A) Group of genera which are closely related is called family.  
Reason (R) Blattidae is a family which contain pigeons and doves having different genera and species.
- (A) A and R both are true and R is a correct explanation of A  
(B) A and R both are true and R is not a correct explanation of A  
(C) A is true and R is wrong  
(D) A is wrong and R is true
57. Assertion (A) Binomial nomenclature method is given by Linnaeus.  
Reason (R) Linnaeus is known as father of taxonomy.
- (A) A and R both are true and R is a correct explanation of A  
(B) A and R both are true and R is not a correct explanation of A  
(C) A is true and R is wrong  
(D) A is wrong and R is true
58. Assertion (A) Organogenesis and Differentiation takes place during growth.  
Reason (R) Number of cells increase during growth.
- (A) A and R both are true and R is a correct explanation of A  
(B) A and R both are true and R is not a correct explanation of A  
(C) A is true and R is wrong  
(D) A is wrong and R is true



59. Assertion (A) Organism must be given two names.  
Reason(R) Species name must be written in small letter.  
(A) A and R both are true and R is a correct explanation of A  
(B) A and R both are true and R is not a correct explanation of A  
(C) A is true and R is wrong  
(D) A is wrong and R is true
60. Assertion (A) Every organism posses reproduction,growth,development,adaptation and death as unique characters.  
Reason (R) Energy transformation is essential for every organism.  
(A) A and R both are true and R is a correct explanation of A  
(B) A and R both are true and R is not a correct explanation of A  
(C) A is true and R is wrong  
(D) A is wrong and R is true
61. A group of interconnected genera is called .....
- (A) Family                      (B) order                      (C) Phylum                      (D) Class
62. Branch connected with nomenclature,identification and classification is called \_\_\_\_\_.
- (A) Ecology                      (B) Taxonomy                      (C) Morphology                      (D) Physiology
63. The suffix- Phyta indicates \_\_\_\_\_ .
- (A) Family                      (B) Order                      (C) class                      (D) Division
64. Binomial system of nomenclature for plants is effective from \_\_\_\_\_ .
- (A) 5/8/1771                      (B) 1/5/1753                      (C) 1/8/1758                      (D) 6/7/1736

### ANSWER KEY

- |         |         |         |         |
|---------|---------|---------|---------|
| 1. (B)  | 2. (C)  | 3. (B)  | 4. (D)  |
| 5. (C)  | 6. (D)  | 7. (C)  | 8. (C)  |
| 9. (C)  | 10. (A) | 11. (C) | 12. (B) |
| 13. (D) | 14. (D) | 15. (D) | 16. (D) |
| 17. (A) | 18. (B) | 19. (C) | 20. (B) |
| 21. (A) | 22. (D) | 23. (D) | 24. (A) |
| 25. (B) | 26. (C) | 27. (A) | 28. (B) |
| 29. (C) | 30. (C) | 31. (B) | 32. (D) |
| 33. (A) | 34. (A) | 35. (A) | 36. (A) |
| 37. (A) | 38. (B) | 39. (D) | 40. (C) |
| 41. (A) | 42. (C) | 43. (C) | 44. (D) |
| 45. (D) | 46. (D) | 47. (D) | 48. (A) |
| 49. (D) | 50. (D) | 51. (C) | 52. (A) |
| 53. (B) | 54. (D) | 55. (A) | 56. (C) |
| 57. (B) | 58. (D) | 59. (A) | 60. (B) |
| 61. (A) | 62. (B) | 63. (D) | 64. (B) |

## Unit -I

### Chapter 2. Classification Aids

#### IMPORTANT POINTS

A number of taxonomical aids have been developing for identification naming and classification of organisms. Actual specimens are collected from the field and preserved in the form of herbaria and museum. Line specimen of plants and animals are found in botanical garden and Zoological park respectively. In museum there are specific methods to store plant specimens.

1. The most famous botanical garden of the world is.....  
(A) Lloyd botanical Garden, Darjelling  
(B) New York Botanical Garden, U.S.A  
(C) Royal Botanical Garden, Kew, England  
(D) Royal Botanical Garden, Sydney, Australia
2. A place of collection of dried plant specimens is———  
(A) Arbarium (B) Herbarium (C) Botanical Garden (D) All above
3. One of the largest herbarium is located in———  
(A) Kew (B) Geneva (C) Berlin (D) Sweden
4. One of the most important functions of botanical garden is that———  
(A) One can observe tropical plants here  
(B) They allow ex-situ conservation of germ plasm  
(C) They provide the natural habitat for wild life  
(D) They provide a beautiful area for recreation
5. In your opinion, which is the most effective way to conserve the plant diversity of an area?  
(A) By creating biosphere reserve  
(B) By creating botanical garden  
(C) By developing seed bank  
(D) By tissue culture method
6. Kew, London is famous for———  
(A) Being largest biological reserve  
(B) Being largest national park  
(C) Being one of the largest herbarium  
(D) Diverse flora and fauna
7. Where the botanical name of plants is labeled?  
(A) Sanctuary (B) National park (C) Botanical garden (D) All above

8. Botanical garden provide———  
 (A) Provide natural habitat for wild life  
 (B) In-situ conservation  
 (C) Ex-situ conservation  
 (D) All above
9. Where Rajaji national park is located?  
 (A) Karnataka            (B) Uttarakhand            (C) Tamilnadu            (D) Assam
10. Who prepare red list for endangered species?  
 (A) Botanical survey of India            (B) Zoological survey of India  
 (C) Geological survey of India            (D) A-ll above
11. Where endangered animal species are kept for reproduction?  
 (A) Laboratory            (B) Zoological park            (C) National park (D) Sanctuary
12. Where the Arignar Anna Zoological park is located?  
 (A) New Delhi            (B) Mumbai            (C) Gangtok            (D) Chennai
13. Which of the following is a correct sequence?  
 (A) Labeling-pressing-collection-drying-poisoning-mounting  
 (B) collection-pressing-drying-poisoning-labeling-mounting  
 (C) collection-pressing-drying-poisoning-mounting-labeling  
 (D) collection-pressing-poisoning-drying-mounting-labeling
14. Snake house: Zoological park: Orchidium: ——  
 (A) Museum            (B) Herbarium            (C) Botanical garden            (D) Animal museum
15. Cactus house: Botanical garden: Reptile house: ——  
 (A) Museum            (B) Herbarium            (C) Botanical garden            (D) Zoological park
16. Greenhouse: Botanical garden: Ethonogallary: ——  
 (A) Museum            (B) Herbarium            (C) Botanical garden            (D) Zoological park
17. Skeleton gallery: Museum: Fernary: ——  
 (A) Museum            (B) Herbarium            (C) Botanical garden            (D) Zoological park
18. At which places museum are more rich and informative?  
 (A) Schools            (B) Colleges            (C) Universities            (D) Above all
19. Ex-situ conservation and inbreeding between animals whose aim is this?  
 (A) Zoological park            (B) Zoo's            (C) Botanical garden            (D) Museum
20. What can be developed for conservation of rare genes?  
 (A) Seed bank            (B) Gene bank            (C) Gene complex            (D) genetic code
21. Staff of Botanical garden gives understanding of——  
 (A) Landscape gardening            (B) Horticulture operations  
 (C) Germ plasm bank            (D) A and B both
22. Where the British museum of Royal Botanical Garden is located?  
 (A) Paris            (B) Kew            (C) Kolkata            (D) Dehradon



23. Where the Herbarium of forest research is located?  
 (A) Paris (B) Kew (C) Kolkata (D) Dehradun
24. Where the New York Botanical Garden is located?  
 (A) Briton (B) U.S.A. (C) USSR (D) UAE
25. Where the Lyoid Botanical Garden is situated?  
 (A) Cheenai (B) Darjilling (C) Lucknow (D) Shibipur
26. Match the following with correct combination
- |                        |  |
|------------------------|--|
| (A) Herbarium          | (a) Ex-situ conservation                             |
| (B) Botanical Garden   | (b) It provide key for Natural classification system |
| (C) Museum             | (c) Conservation of Natural Resorcis                 |
| (D) Zoological Park    | (d) Coservation of Biodiversity                      |
| (a) A-b, B-c, C-d, D-a | (b) A-d, B-c, C-b, D-a                               |
| (c) A-c, B-a, C-d, D-b | (d) A-d, B-a, C-b, D-c                               |
27. Match the following with correct combination
- | Column-1                                     | Column-2          |
|--|-------------------|
| (A) Central National Herbarium               | (a) Paris         |
| (B) Herbarium of forest Research Institute   | (b) Kolkata       |
| (C) British Museum of Royal Botanical Garden | (c) Dehradoon     |
|  | (d) England       |
| (a) A-b, B-c, C-d                            | (b) A-c, B-d, C-a |
| (c) A-a, B-b, C-c                            | (d) A-b, B-d, C-a |
28. Match the following with correct combination
- | Column-1                       | Column-2               |
|--------------------------------|------------------------|
| (A) Natural History Museum     | (a) France             |
| (B) Government Museum          | (b) Mumbai             |
| (C) Zoological Survey of India | (c) Cheenai            |
| (D) Museum of Natural History  | (d) Kolkata            |
| (a) A-a, B-c, C-b, D-d         | (b) A-d, B-c, C-a, D-b |
| (c) A-b, B-c, C-d, D-a         | (d) A-d, B-b, C-a, D-c |
29. Match the following with correct combination
- | Column-1                 | Column-2               |
|--------------------------|------------------------|
| (A) Fumigation system    | (p) Botanical Garden   |
| (B) Conservation         | (q) Herbarium          |
| (C) Ethenogallery        | (r) Zoological Park    |
| (D) Ex-situ conservation | (d) Museum             |
| (A) A-p, B-r, C-q, D-s   | (b) A-s, B-p, C-q, D-r |
| (C) A-q, B-r, C-s, D-p   | (d) A-q, B-p, C-s, D-r |

30. Find the correct statements for the following
- (A) The mission of museum is preserve cultural heritage  
 (B) Ex-situ conservation had been done in Zoological Park  
 (C) In-situ conservation had been done in Zoological Park  
 (D) Breeding of extinct species  
 (a) A,B,C                      (b) A,B,D                      (c) B,C,D                      (d) A,C,D
31. Find the correct statements for the following
- (A) Botanical Garden provide classification Interrelation  
 (B) Gene diversity improve in Botanical Garden  
 (C) Endangered plants are protected in Botanical Garden  
 (D) New varieties are developed through hybridization in Botanical Garden  
 (a) A,B,C                      (b) B,C,D                      (c) A, B, D                      (d) A, C, D
32. Which of the following statement are correct?
- (A) The mission of museum is to preserve biological diversity and cultural heritage  
 (B) Several major botanical gardens of the world have museum and zoological parks as an integral part of their facilities  
 (C) Botanical garden is a store house of plant specimen collected from different localities  
 (D) New varieties are developed through grafting, tissue culture, cloning and hybridization in botanical garden  
 (a) Only B                      (b) A and D only                      (c) B and C only                      (d) C and D only
33. Which of the following statement are correct?
- (A) Classification enables us to know interrelationship between organisms  
 (B) Classification enables us to give information about bio-resources  
 (C) Bio-diversity increased by classification  
 (D) Flora and fauna can be prepared through classification  
 (a) A, B, C                      (b) B, C, D                      (c) A, B, D                      (d) A, C, D
34. Pick out the correct statements
- (A) Animal fossil specimens are collected in the museum only  
 (B) Zoological parks are being run and managed by both private and government organizations  
 (C) Flora and fauna of various geographical regions can be prepared through animal taxonomic study  
 (D) Plants from other regions are grown in botanical garden for identification purpose  
 (a) A and C                      (b) B and D                      (c) A, C and D                      (d) A and D
35. Which one of the taxonomic aids can give comprehensive account of complete compiled information of any one genus or family at a particular time
- (A) Taxonomic key                      (B) Flora  
 (C) Herbarium                      (D) Monograph
36. The zoological parks are working under supervision of \_\_\_\_\_
- (A) ICZN                      (B) IABG                      (C) ICBN                      (D) CZA

37. Who provide information regarding animal behavior, adaptation, nutrition, evolution and ecology?  
 (A) Herbarium (B) Zoological park (C) Museum (D) Ethnogallary
38. Ethnogallary is a part of———  
 (A) Herbarium (B) parks (C) Botanical garden (D) Museum
39. How many botanical gardens are documented in “IABG”?  
 (A) 80 (B) 800 (C) 8000 (D) 8
40. “Specific preservative chemicals for preservation are sprayed on plant specimen”. This process is known as ——  
 (A) Pressing (B) Poisoning (C) Drying (D) Mounting
41. Who provides key for the preparation of modern system of classification?  
 (A) Zoological park (B) Herbarium (C) Museum (D) Botanical garden
42. What is used for drying plant specimens?  
 (A) Filter paper (B) Blotting paper (C) Parchment paper (D) Cellophane paper
43. Who provide ecological, economical and ethnobotanical data of any plant species?  
 (A) Botanical garden (B) Herbarium (C) Zoological park (D) Photographs
44. Where dry specimen of plants preserved?  
 (A) Herbarium (B) Botanical garden (C) Glass house (D) National park
45. Who promote the eco-tourism?  
 (A) Zoological park (B) Herbarium (C) Botanical park (D) Museum
46. Assertion (A) Botanical gardens are different from public park and gardens  
 Reason (R) Plant species in botanical garden are grown for identification purpose  
 (A) A and R both are true and R is correct explanation of A  
 (B) A and R both are true and R is not correct explanation of A  
 (C) If A is true and R is wrong  
 (D) If A is wrong and R is true
47. Assertion (A) Herbarium provides research facilities to the students of taxonomic research  
 Reason (R) Herbarium provides key for the preparation of modern system of classification  
 (A) A and R both are true and R is correct explanation of A  
 (B) A and R both are true and R is not correct explanation of A  
 (C) If A is true and R is wrong  
 (D) If A is wrong and R is true
48. Assertion (A) Herbarium is a store house of plant specimens collected from different localities  
 Reason (R) In Herbaria, specimens are preserved in specific methods  
 (A) A and R both are true and R is correct explanation of A  
 (B) A and R both are true and R is not correct explanation of A  
 (C) If A is true and R is wrong  
 (D) If A is wrong and R is true



49. Assertion (A) Botanical garden provides necessary information for verifying and identifying newly collected plant specimens  
Reason (R) Zoological parks promote eco-tourism for employment and sustainable life
- (A) A and R both are true and R is correct explanation of A  
(B) A and R both are true and R is not correct explanation of A  
(C) If A is true and R is wrong  
(D) If A is wrong and R is true
50. Assertion (A) Herbarium provides necessary information for verifying and identifying newly collected plant specimens  
Reason (R) Zoological parks promote eco-tourism for employment and sustainable life
- (A) A and R both are true and R is correct explanation of A  
(B) A and R both are true and R is not correct explanation of A  
(C) If A is true and R is wrong  
(D) If A is wrong and R is true
51. Assertion (A) In herbaria new varieties are developed through tissue culture, cloning, grafting and hybridization  
Reason (R) Herbarium provides necessary information for verifying and identifying newly collected plant specimens
- (A) A and R both are true and R is correct explanation of R  
(B) A and R both are true and R is not correct explanation of A  
(C) If A is true and R is wrong  
(D) If A is wrong and R is true
52. Assertion (A) The biological museum are generally set up in educational institutes such as schools, colleges and universities  
Reason (R) University museums are much more rich and informative
- (A) A and R both are true and R is correct explanation of R  
(B) A and R both are true and R is not correct explanation of R  
(C) If A is true and R is wrong  
(D) If A is wrong and R is true
53. Assertion (A) The mission of museum is increase in bio-diversity  
Reason (R) The mission of museum is increase in cultural heritage
- (A) A and R both are true and R is correct explanation of R  
(B) A and R both are true and R is not correct explanation of R  
(C) If A is true and R is wrong  
(D) If A is wrong and R is true
54. Assertion (A) Zoological survey of India is located in Mumbai.  
Reason (R) Government museum is located in Chennai.
- (A) A and R both are true and R is correct explanation of R  
(B) A and R both are true and R is not correct explanation of R

- (C) If A is true and R is wrong
- (D) If A is wrong and R is true

55. Assertion (A) The geographical distribution explained through taxonomy.

Reason ( R) Flora and fauna of various geographical regions can be prepared through taxonomy

- (A) A and R both are true and R is correct explanation of R
- (B) A and R both are true and R is not correct explanation of R
- (C) If A is true and R is wrong
- (D) If A is wrong and R is true

### ANSWER KEY

1	C	27	A	53	C
2	B	28	C	54	B
3	A	29	D	55	A
4	B	30	B		
5	A	31	D		
6	C	32	B		
7	C	33	C		
8	C	34	B		
9	B	35	D		
10	A	36	D		
11	B	37	B		
12	D	38	D		
13	C	39	B		
14	C	40	B		
15	D	41	B		
16	A	42	B		
17	C	43	B		
18	C	44	A		
19	A	45	A		
20	B	46	A		
21	D	47	B		
22	B	48	A		
23	D	49	D		
24	B	50	B		
25	B	51	D		
26	A	52	B		



## Unit :- I

### Chapter-3. Classification of Plant Kingdom

#### IMPORTANT POINTS

Five kingdom classification system was given by Whittaker on the basis of following four criteria :

- (i) Cell structure
- (ii) Body Structure
- (iii) Mode of nutrition - Autotrophic and Heterotrophic
- (iv) Major ecological role.

The five kingdoms are Monera, Protista, Fungi, Plantae and Animalia.

The three-domain system is closely based on five-kingdom system.

The Eukarya are then divided into 4 kingdoms :

Protista, Fungi, plantae and animalia.

**Viroids** were discovered by Diener from infectious agents which are even smaller than viruses. It consists of a very simple structure and short RNA strand viroids lack protective protein coat known as capsid.

**Viruses** are self reproducing and obligate parasite in living cells : They Viroids remain inactive and behave as non-living things. When they enter inside of the living cells, they are active and behave as living organisms Because of this they are intermediate between living and non-living things. They are also called as living chemical.

**Algae, Fungi and Lichens** are included under thallophyta. The gametophytic plant body is thalloid, without differentiation in to true root, stem and leaves. Zygote does not develop into embryo. Algae have Chlorophylls and they synthesize their own food so it is Autotrophs, while Fungi are non chlorophylls and they do not Synthesize their own food so it own is called heterotrophs. The lichens, show symbiotic relationship between algae and fungi components.

**Bryophytes** are non vascular plants. After fertilization Zygote undergoes divisions to form embryo. The life cycle of bryophytes has two distinct phases.

- (1) Gametophytic phases - Haploid, main, autotrophic and gametes formative
- (2) Sporophytic phase - Diploid, Subsidiary, heterotrophic, spores formative.

**Pteridophytes** have vascular tissues, and develop the embryo. The life cycle of pteridophytes shows alternation of generation. Gemetophytic phase is haploid, subsidiary, short lived and Gametes producing while sporophytic phase is diploid, main long lived and spores producing.

**Gymnosperm** is sporophytic. It is differentiated into root, stem and leaves. Ovules are naked and not enclosed by the ovary therefore recognized as a gymnosperm. The sporophytic and gametophytic phases alternate with each other to complete the life cycle. Gametophytic phase is haploid, subsidiary, short lived and under ground and sporophytic phase is diploid, Main, long and as a whole plant.

Endosperm develops before fertilization, ovules are orthotropous and true fruits are lacking because, of the absence of ovary.



In **angiosperms**, sporophytic plant body is in the form of herbs, shrubs, trees, climbers or lianas. Ovules are enclosed in the ovary therefore, recognized as angiosperms. Endosperm is developed after fertilization. Members of this group show double fertilization. After fertilization ovules are transformed into seeds and ovary into fruit. The plant life cycle shows alternation of generation.

Bentham and Hooker classified the angiosperms into two classes. (1) Dicotyledon and (2) Monocotyledon.

**From the given options, select the correct option (a, b, c, d) Each carries one mark.**

- Which of the following is included in five kingdom classification.  
 (A) Monera, Protista, Animalia, Plantae, Algae  
 (B) Monera, Protista, Fungi, Plantae, Animalia  
 (C) Virus, Prokaryota, Fungi, Plantae, Animalia  
 (D) Algae, Fungi, Bryophyta, Pteridophyta, Gymnosperm
- Who is the "Father of Taxonomy" among the following ?  
 (A) Linnaeus (B) Aristotle (C) Maheshwari (D) Birbal Sahani
- Halophiles is also called....  
 (A) Eubacteria (B) Actinomycetes (C) Cynobacteria  
 (D) Archae bacteria
- According to Whittaker's classification, prokaryotes are placed in \_\_\_\_\_.  
 (A) Monera (B) Plantae (C) Protista (D) Animalia
- Example of blue green algae is in \_\_\_\_\_.  
 (A) Fungi (B) Monera (C) Protista (D) Plantae
- By how many criteria, living organisms have been classified into five kingdom.  
 (A) Two (B) Four (C) Five (D) Three
- In which of the following kingdoms, bacteria and blue-green algae are included ?  
 (A) Monera (B) Plantae (C) Animalia (D) Protista
- Prokaryotes are included in the kingdom \_\_\_\_\_.  
 (A) Monera (B) Protista (C) Protozoa (D) Basidiomycetes
- Which one of the following is also called halophiles ?  
 (A) Eubacteria (B) Actinomyces (C) Cyanobacteria (D) Archaeobacteria
- Match the following.
 

A	B
(p) Archaea	(i) Cell wall is made up of either cellulose or Fungal-cellulose
(q) Bacteria	(ii) Cell wall does not contain peptidoglycan
(r) Eukarya	(iii) Cell wall is made up of peptidoglycan.
(A) p - (iii), q - (i), r - (ii)	(B) p - (i), q - (ii), r - (iii)
(C) p - (ii), q - (i), r - (iii)	(D) p - (ii), q - (iii), r - (i)

11. Viroids were discovered by .....
- (A) Diener                      (B) Woese                      (C) Pasteur                      (D) Iyengar
12. Viroid consists of.....
- (A) DNA                      (B) RNA                      (C) Protein                      (D) none of above
13. Which of the following diseases is caused by viroid ?
- (A) Polio                      (B) Diphtheria                      (C) Alzheimers                      (D) Typhoid
14. The name virus was given by \_\_\_\_\_ .
- (A) Ivanowsky                      (B) Pasteur                      (C) Diener                      (D) Hershey
15. Virus have ....
- (A) DNA core, Lipid coat                      (B) DNA or RNA core, Protein coat  
(C) DNA or RNA core, plasma membrane                      (D) DNA containing nucleus, lipid envelope
16. A virus contains \_\_\_\_\_ .
- (A) DNA                      (B) RNA                      (C) DNA or RNA                      (D) DNA and RNA
17. TMV virus was discovered by \_\_\_\_\_ .
- (A) Pasteur                      (B) S. L. Miller                      (C) Ivanowsky                      (D) W. M. Stanley
18. The main structural component of virus is \_\_\_\_\_ .
- (A) nucleic acid                      (B) Protein  
(C) nucleic acid and protein                      (D) nucleic acid or protein
19. The first existing group of plant is \_\_\_\_\_ .
- (A) Fungi                      (B) Alage                      (C) Lichens                      (D) Pteridophytes
20. Match the following :
- |   |  |
|---|--|
| <p style="text-align: center;">A</p> <p>(p) Chlamydomonas</p> <p>(q) Volvox</p> <p>(r) Ulothrix</p> <p>(s) Nostoc</p> <p>(A) p - (i), q - (ii), r - (iii), s-(iv)</p> <p>(C) p - (iii), q - (i), r - (iv), s-(ii)</p> | <p style="text-align: center;">B</p> <p>(i) Colonial Forms</p> <p>(ii) Unicellular</p> <p>(iii) Filamentous forms</p> <p>(iv) Cyanophyceae</p> <p>(B) p - (ii), q - (iii), r - (i), s-(iv)</p> <p>(D) p - (ii), q - (i), r - (iii), s-(iv)</p> |
|---|--|
21. The study of algae is called \_\_\_\_\_ .
- (A) Mycology                      (B) Algology                      (C) Taxonomy                      (D) Lichenology
22. Unicellular eukaryotic microorganisms comprise \_\_\_\_\_ .
- (A) Fungi                      (B) Monera                      (C) Plants                      (D) Protista
23. Protista include :
- (A) Paramecium, Euglena, Dinoflagellates                      (B) Hydra, Amoeba, Paramoecium  
(C) Yeast, Euglena, Dinoflagellates                      (D) Mushroom, Paramoecium, Euglena.
24. The study of fungi is \_\_\_\_\_ .
- (A) Cytology                      (B) Mycology                      (D) Virology                      (D) Algology

25. Fungus cell wall is made up of \_\_\_\_\_ .  
 (A) Cellulose (B) Protein (C) Chitin (D) Carbohydrates
26. In Fungi reserved food materials are \_\_\_\_\_ .  
 (A) Glycogen and Lipid droplets (B) Starch  
 (C) Protein (D) Lipid
27. Match the following :
- | A                                | B                                |
|----------------------------------|----------------------------------|
| (p) Yeast                        | (i) Bread mould                  |
| (q) Mucor                        | (ii) Mushroom                    |
| (r) Agaricus                     | (iii) Unicellular                |
| (A) p - (ii), q - (i), r - (iii) | (B) p - (i), q - (ii), r - (iii) |
| (C) p - (iii), q - (i), r - (ii) | (D) p - (iii), q - (ii), r - (i) |
28. Study of lichens is called \_\_\_\_\_ .  
 (A) Algology (B) Mycology (C) Lichenology (D) Cytology
29. Lichens were first discovered by \_\_\_\_\_ .  
 (A) Iyengar (B) Tulsane (C) Pasteur (D) Shiv Ram Kashyap
30. In lichens Algal component is known as \_\_\_\_\_ .  
 (A) mycobiont (B) Phycobiont (C) A & B (D) none of these
31. In lichens fungal component is known as \_\_\_\_\_ .  
 (A) mycobiont (B) phycobiont (C) A & B (D) none of these
32. The plant cell without chloroplast is \_\_\_\_\_ .  
 (A) Algae (B) Fungi (C) Bryophytes (D) pteridophytes
33. The shape of Fruting body of lichens is \_\_\_\_\_ .  
 (A) apothecium - flask shaped (B) perithecium - cup shaped  
 (C) perithecium - flask shaped (D) apothecium - Disc chaped
34. On the basis of external form lichen are \_\_\_\_\_ .  
 (A) Crustose (B) Foliose (C) Fruticose (D) All of the three
35. "Fruting body" is characteristic of \_\_\_\_\_ .  
 (A) Algae (B) Lichens (C) Bryophytes (D) Pteridophytes
36. Symbiotic relationship is found in \_\_\_\_\_ .  
 (A) Algae (B) Fungi (C) Bryophytes (D) Lichens
37. Plant of this group possess naked seed  
 (A) Pteridophytes (B) Angiosperms (C) Gymnosperms (D) Bryophytes
38. The father of Indian Bryology is \_\_\_\_\_ .  
 (A) Tulsane (B) Professor Iyengar  
 (C) Ivanowsky (D) Pro. Shiv Ram Kashyap
39. Rothmelur has divided the Bryophytes into \_\_\_\_\_ .  
 (A) 3 classes (B) 4 classes (C) 5 classes (D) 6 classes

40. Which sentence is true for Bryophytes ?  
 (A) They are autotrophic  
 (B) Vascular tissues are absent  
 (C) Fertilization takes place in the presence of water  
 (D) All of the three
41. In which plant, gametophytic phase is main and sporophytic phase is subsidiary.  
 (A) Bryophytes            (B) Pteridophytes            (C) Gymnosperms            (D) Angiosperms
42. The first land plant on earth was \_\_\_\_\_ .  
 (A) Bryophytes            (B) Pteridophytes            (C) Gymnosperms            (D) Angiosperms
43. Match the following :
- |   |  |
|---|--|
| <p style="text-align: center;">A</p> <p>(p) Nephrolepis<br/>                 (q) Equisetum<br/>                 (r) Selaginella<br/>                 (s) Rhynia</p> | <p style="text-align: center;">B</p> <p>(i) heterosporous<br/>                 (ii) Fossil<br/>                 (iii) homosporous<br/>                 (iv) Common</p> |
| (A) p - (iv), q - (iii), r - (i), s - (ii)  | (B) p - (iv), q - (iii), r - (ii), s - (i)   |
| (C) p - (iv), q - (ii), r - (iii), s - (i)  | (D) p - (iv), q - (i), r - (ii), s - (iii)   |
44. In which plant, the gametophytic phase is main and sporophytic phase is subsidiary.  
 (A) Nephrolepis            (B) Selaginella            (C) Anthoceros            (D) Equisetum
45. The tallest living tree in the world is \_\_\_\_\_ .  
 (A) Zamia sp.            (B) Eucalyptus sp.            (C) Wolffia sp.            (D) Sequoia sp.
46. The smallest gymnosperm is \_\_\_\_\_ .  
 (A) Zamia sp.            (B) Eucalyptus            (C) Wolfia sp.            (D) Sequoia sp.
47. Xerophytic Characters are present in \_\_\_\_\_ .  
 (A) Bryophytes            (B) Pteridophytes            (C) Gymnosperms            (D) Angiosperms
48. Microsporophyll : Stamen then Megasporophyll : \_\_\_\_\_ .  
 (A) anther            (B) gynoecium            (C) Pollen grains            (D) ovule
49. Match the following :
- |   |   |
|---|---|
| <p style="text-align: center;">A</p> <p>(p) Microsporophyll<br/>                 (q) Microsporangium<br/>                 (r) microspores<br/>                 (s) megasporophyll</p> | <p style="text-align: center;">B</p> <p>(i) Pollen grain<br/>                 (ii) Stamen<br/>                 (iii) anther<br/>                 (iv) gynoecium</p> |
| (A) p - (iv), q - (iii), r - (i), s - (ii)  | (B) p - (ii), q - (i), r - (iii), s - (iv)  |
| (C) p - (iii), q - (ii), r - (i), s - (iv)  | (D) p - (ii), q - (iii), r - (i), s - (iv)  |
50. Which is the Fossil member ?  
 (A) Cycas            (B) Bennettites            (C) Thuja            (D) Pinus

51. The biggest and dominant group is \_\_\_\_\_ .  
 (A) Bryophytes      (B) Pteridophytes      (C) Gymnosperms      (D) Angiosperms
52. Match the following :
- | A  | B  |
|--|--|
| (p) Wolffia globosa                        | (i) largest plant                          |
| (q) Eucalyptus sp                          | (ii) largest flower                        |
| (r) Rafflesia arnoldii                     | (iii) smallest plant                       |
| (s) Agave sp.                              | (iv) largest inflorescence                 |
| (A) p - (i), q - (ii), r - (iii), s - (iv) | (B) p - (iii), q - (ii), r - (i), s - (iv) |
| (C) p - (iii), q - (i), r - (iv), s - (ii) | (D) p - (iii), q - (i), r - (ii), s - (iv) |
53. Pre-fertilized endosperm is characteristic of \_\_\_\_\_ .  
 (A) Pteridophytes      (B) Angiosperms      (C) Gymnosperms      (D) Bryophytes
54. Class dicotyledon is divided into \_\_\_\_\_ .  
 (A) 7 sub classes      (B) 5 sub classes      (C) 3 sub classes      (D) 2 sub classes.
55. Who classified the Angiosperms into two classes ?  
 (A) Theoprattus      (B) Bentham and Hooker  
 (C) Aristotle      (D) Linnaeus
56. Presence of rigid cell wall is characterized by kingdom \_\_\_\_\_ .  
 (A) Protista      (B) Plantae      (C) Monera      (D) Animalia
57. The tallest living tree of a Angiosperm is \_\_\_\_\_ .  
 (A) Wolffia sp.      (B) Zamia sp.      (C) Eucalyptus sp.      (D) Sequoia sp.
58. If the seeds are formed from the megasporophylls and not enclosed in a fruits the plant belongs to \_\_\_\_\_ .  
 (A) Pteridophytes      (B) Bryophytes      (C) Angiosperms      (D) Gymnosperms
59. Embryo is not formed in \_\_\_\_\_ .  
 (A) Bryophytes      (B) Algae      (C) Gymnosperms      (D) Pteridophytes
60. Which classification system had been given by Whittaker ?  
 (A) Three domain classification      (B) Binomial classification  
 (C) Five kingdom classification      (D) Artificial classification
61. A = Lichens show symbiotic relationship between algae and fungi.  
 R = Algae absorb water and mineral nutrients from environment and provides to fungi. While fungi synthesize food by the process of photo synthesis and provide to algae.  
 (A) Both (A) and (R) true and (R) is the correct explanation of (A)  
 (B) Both (A) and (R) are true but (R) is not the correct explanation of (A)  
 (C) (A) is true statement but (R) is false  
 (D) A is false and R is true.

**ANSWER KEY**

1. (B)	2. (A)	3. (D)	4. (A)
5. (B)	6. (B)	7. (A)	8. (A)
9. (D)	10. (D)	11. (A)	12. (B)
13. (C)	14. (B)	15. (B)	16. (C)
17. (C)	18. (C)	19. (B)	20. (D)
21. (B)	22. (C)	23. (A)	24. (B)
25. (C)	26. (A)	27. (C)	28. (C)
29. (B)	30. (B)	31. (A)	32. (B)
33. (C)	34. (D)	35. (B)	36. (D)
37. (C)	38. (D)	39. (A)	40. (D)
41. (A)	42. (B)	43. (A)	44. (C)
45. (D)	46. (A)	47. (C)	48. (B)
49. (D)	50. (B)	51. (D)	52. (D)
53. (C)	54. (C)	55. (B)	56. (C)
57. (D)	58. (D)	59. (B)	60. (C)
61. (C)			





**Unit:- I****Chapter-4. Animal Kingdom****IMPORTANT POINTS**

The basic fundamental features such as level of organisation, symmetry, cell organisation, coelom, segmentation, notochord, etc., have enabled us to broadly classify the animal kingdom. Besides the fundamental features, there are many other distinctive characters which are specific for each phyla or class.

Porifera includes multicellular animals which exhibit cellular level of organisation and have characteristic flagellated choanocytes. The coelenterates have tentacles and bear cnidoblasts. They are mostly aquatic, sessile or free-floating. The ctenophores are marine animals with comb plates. The platyhelminths have flat body and exhibit bilateral symmetry. The parasitic forms show distinct suckers and hooks. Aschelminthes are pseudocoelomates and include parasitic as well as non-parasitic round worms.

Annelids are metamerically segmented animals with a true coelom. The arthropods are the most abundant group of animals characterised by the presence of jointed appendages. The molluscs have a soft body surrounded by an external calcareous shell. The body is covered with external skeleton made of chitin. The echinoderms possess a spiny skin. Their most distinctive feature is the presence of water vascular system. The hemichordates are a small group of worm-like marine animals. They have a cylindrical body with proboscis, collar and trunk.

Phylum Chordata includes animals which possess a notochord either throughout or during early embryonic life. Other common features observed in the chordates are the dorsal, hollow nerve cord and paired pharyngeal gill slits. Some of the vertebrates do not possess jaws (Agnatha) whereas most of them possess jaws (Gnathostomata). Agnatha is represented by the class, Cyclostomata. They are the most primitive chordates and are ectoparasites on fishes. Gnathostomata has two super classes, Pisces and Tetrapoda. Classes Chondrichthyes and Osteichthyes bear fins for locomotion and are grouped under Pisces. The Chondrichthyes are fishes with cartilaginous endoskeleton and are marine. Classes, Amphibia, Reptilia, Aves and Mammalia have two pairs of limbs and are thus grouped under Tetrapoda. The amphibians have adapted to live both on land and water. Reptiles are characterised by the presence of dry and cornified skin. Limbs are absent in snakes. Fishes, amphibians and reptiles are poikilothermous (cold-blooded), Aves are warm-blooded animals with feathers on their bodies and forelimbs modified into wings for flying. Hind limbs are adapted for walking, swimming, perching or clasping. The unique features of mammals are the presence of mammary glands and hairs on the skin. They commonly exhibit viviparity.

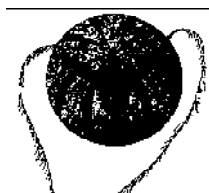
**For the given options select the correct options (A, B, C, D) each carries one mark.**

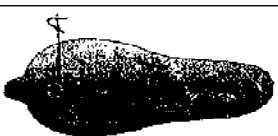
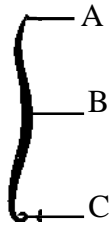
- Which of the following is a characteristic feature of sponges ?  
 (A) Tissue level of organization (B) Presence of ostia  
 (C) Extra cellular digestion (D) Indirect development
- Collar cells are found in  
 (A) Sponges (B) roundworms (C) earthworm (D) spider

3. The canal system is characteristic feature of  
 (A) Arthropods            (B) Mollusca            (C) sponges            (D) echinoderms
4. Which of the following phylum animals are mostly found in marine water but few are in freshwater.  
 (A) Annelida            (B) Porifera            (C) Mollusca            (D) Chordata
5. Skeleton is made up of ..... in porifera.  
 (A) Spicules            (B) Spongin            (C) Both a and b            (C) Chitin
6. Cavity of coelenterates is called  
 (A) cavity            (B) coelom            (C) coelenteron            (D) all above
7. Find the odd  
 (A) Sea fan            (B) sea horse            (C) sea cucumber            (D) sea lily
8. Which animal has a cylindrical form  
 (A) Physalia            (B) Adamsia            (C) Hydra            (D) b & c
9. Which animal is umbrella-shaped and free swimming .....  
 (A) Aurelia            (B) Jelly-fish            (C) Hydra            (D) a & b
10. Which of the following is rightly matched ?  
 (A) Physalia - portuguese man of war  
 (B) pennatula - sea fan  
 (C) Adamsia - sea-pen  
 (D) aorgania - sea anemone
11. Corals have a skeleton composed of .....  
 (A)  $\text{CaCO}_3$             (B)  $\text{CaPO}_4$             (C)  $\text{CaCl}_2$             (D)  $\text{CaSiO}_2$
12. Match the item in column I with column II and choose the option showing correctly matched pairs.
 

I	II
(p) porifera	(i) spongila
(q) Cnidaria	(ii) liver fluke
(r) platyhelminthes	(iii) Neris
(s) Annelida	(iv) Adamsia

(A) p - (iv), q - (ii), r - (i), s - (iii)  
 (B) p - (i), q - (iv), r - (ii), s - (iii)  
 (C) p - (i), q - (iv), r - (iii), s - (ii)  
 (D) p - (iv), q - (ii), r - (iii), s - (i)
13. Cnidoblasts are used for .....  
 (A) Anchorage            (B) Defense            (C) Capture            (D) All of the given
14. Gastro-vascular cavity is located in.....  
 (A) Earth worm            (B) Hydra            (C) Liver fluke            (D) Ascaris
15. Identify the animal shown in diagram  
 (A) Tape worm  
 (B) pleurobrachia  
 (C) Neris  
 (D) Octopus

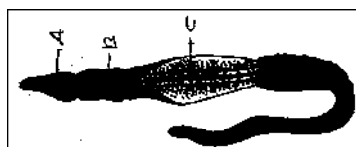


16. The body bears \_\_\_\_\_ external rods of ciliated comb plates in pleurobrachia  
 (A) Eight (B) Four (C) Ten (D) Sixteen
17. Ctenophores commonly known as \_\_\_\_\_  
 (A) Flat worms (B) Sea walnuts (C) round worms (D) sponges
18. In the given diagram what does 'A' represent ?  
 (A) Hooks (B) suckers (C) Flame cell (D) Ostia
- 
- i19. The excretory cells, that are found in platyhelminthes are \_\_\_\_\_  
 (A) Nephridia (B) Coller cells (C) Flame cells (D) all above
20. Function of suckers cell in liverflulke  
 (A) Defense (B) Roproduction (C) Locomotion (D) Absorb nutrients
21. Ascaris is found in  
 (A) body cavity (B) tissue (C) alimentary canal (D) lymph nodes
22. What does A, B and C indicates in the given diagram ?  
 (A) A = head B = tail C = female  
 (B) A = head B = tail C = male  
 (C) A = tail B = head C = female  
 (D) A = tail B = head C = male
- 
23. The pseudocoelomate among these is \_\_\_\_\_  
 (A) porifera (B) Annelida (C) Mollusca (D) Aschelminthes
24. Match the following columns and select the option shows correctly matched pairs
- | Column - I                                 | Column - II                                |
|--|--|
| (p) Ascaris                                | (i) Hookworm                               |
| (q) Wuchereria                             | (ii) Round worm                            |
| (r) Ancylostoma                            | (iii) Flatworms                            |
| (s) Tapeworm                               | (iv) Filaria worm                          |
| (A) p - (ii), q - (iv), r - (iii), s - (i) | (B) p - (ii), q - (i), r - (iii), s - (iv) |
| (C) p - (ii), q - (iv), r - (i), s - (iii) | (D) p - (i), q - (ii), r - (iv), s - (iii) |
25. Which is correct for earth worm  
 (A) Segments (B) parapodia (C) Nephridia (D) all of given
26. Neural system consists of paired ganglia connected by lateral nerves to double \_\_\_\_\_ in annelida.  
 (A) ventral nerve cord (B) dorsal nerve cord  
 (C) Anterior nerve cord (D) posterior nerve cord
27. Blood sucking animal is \_\_\_\_\_ .  
 (A) Neris (B) Earthworm (C) a & b (D) Leech
28. \_\_\_\_\_ which help in swimming in Annelida.  
 (A) parapodia (B) Nephridia (C) sucker (D) seaments

29. This is the largest phylum of Animal on the earth.  
 (A) Mollusca (B) Amphibia (C) Arthropoda (D) Aves
30. The body of arthropods is covered by \_\_\_\_\_ exoskeleton.  
 (A) calcium carbonate (B) calcium sulphate (C) chitinous (D) conchium
31. The respiratory organ in arthropods.  
 (A) gill (B) book gill (C) tracheal system (D) all of given
32. The excretory organ in cockroach is  
 (A) green gland (B) malpighian tubules (C) nephridia (D) kidney
33. The mouth contains a file-like rasping organ for feeding, called \_\_\_\_\_ in Mollusca.  
 (A) radula (B) medulla (C) Gizzard (D) teeth
34. Match the following columns and select the correct option.
- | Column - I                                   | Column - II                                |
|--|--|
| (p) pila                                     | (i) Devil fish                             |
| (q) Dentalium                                | (ii) chiton                                |
| (r) chaetopleura                             | (iii) Apple snail                          |
| (s) octopus                                  | (iv) Tusk shell                            |
| (A) p - (ii), q - (iii), r - (iii), s - (iv) | (B) p - (iii), q - (iv), r - (ii), s - (i) |
| (C) p - (ii), q - (iv), r - (i), s - (iii)   | (D) p - (i), q - (ii), r - (iii), s - (iv) |
35. In which of the following phyla, while the adult shows radial symmetry, the larva shows bilateral symmetry ?  
 (A) Mollusca (B) Echinodermata (C) Arthropoda (D) Annelida
36. An excretory system is absent in  
 (A) Sepia (B) Crab (C) Starfish (D) Earthworm
37. Water vascular system which help in \_\_\_\_\_  
 (A) locomotion (B) capture and transport of food  
 (C) respiration (D) all above
38. The body is cylindrical and composed of \_\_\_\_\_ in Hemichordata  
 (A) Proboscis (B) collar (C) trunk (D) all the above
39. Choose correct option for in Hemichordata-a
- |   |
|---|
| (A) I = circulatory system - open<br>II = Respiration - gills<br>III = Excretory system - proboscis gland |
| (B) I = circulatory system - close<br>II = Respiration - gills<br>III = Excretory system - green gland    |
| (C) I = circulatory system - open<br>II = Respiration - gills<br>III = Excretory system - kidney          |
| (D) I = circulatory system - open<br>II = Respiration - lungs<br>III = Excretory system - proboscis gland |

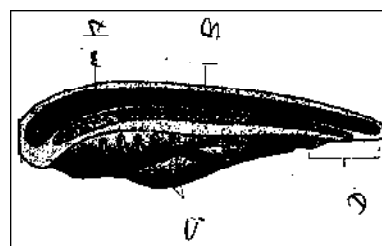
40. Choose the correct combination of labeling from the option given

- |                   |                   |
|-------------------|-------------------|
| (A) A = collar    | (B) A = proboscis |
| B = trunk         | B = collar        |
| C = proboscis     | C = trunk         |
| (C) A = proboscis | (D) A = collar    |
| B = collar        | B = trunk         |
| C = tail          | C = tail          |



41. Select the correct option for the region labelled as A, B and C in the given diagram ?

- |                    |                        |
|--------------------|------------------------|
| (A) A = Nerve cord | (B) A = Nerve cord     |
| B = Notochord      | B = Noto chord         |
| C = Gill slits     | C = post and part      |
| D = Post anal part | D = Gill slits         |
| (C) A = Notochord  | (D) A = post anal part |
| B = Gill slits     | B = Gill slits         |
| C = Neeve chord    | C = Nerve cord         |
| D = Postanal part  | D = Notochord          |

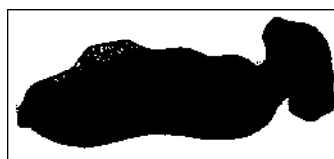


42. Into how many sub-phylum chordata is divided ?

- |         |          |         |           |
|---------|----------|---------|-----------|
| (A) two | (B) four | (C) six | (D) three |
|---------|----------|---------|-----------|

43. Identify the animal

- (A) Ascidia  
 (B) Salpa  
 (C) Amphioxus  
 (D) Doliolum



44. The notochord is replaced by a \_\_\_\_\_ vertebral column in chordal-G.

- |                   |          |                   |                   |
|-------------------|----------|-------------------|-------------------|
| (A) cartilaginous | (B) bony | (C) both of a & b | (D) none of those |
|-------------------|----------|-------------------|-------------------|

45. Notochord is present only in larval tail

- |                 |                     |                |                    |
|-----------------|---------------------|----------------|--------------------|
| (A) urochordata | (B) cephalochordata | (C) vertebrata | (D) protochordates |
|-----------------|---------------------|----------------|--------------------|

46. Vertebrates have ventral muscular heart with \_\_\_\_\_ chambers.

- |         |           |          |               |
|---------|-----------|----------|---------------|
| (A) two | (B) three | (C) four | (D) all above |
|---------|-----------|----------|---------------|

47. .... have a sucking and circular mouth without jawas.

- |             |               |           |          |
|-------------|---------------|-----------|----------|
| (A) lamprey | (B) scoliodon | (C) catla | (D) rohu |
|-------------|---------------|-----------|----------|

48. Larve of ..... after metamorphosis return to the ocean.

- |               |           |             |           |
|---------------|-----------|-------------|-----------|
| (A) scoliodon | (B) shark | (C) lamprcy | (D) catla |
|---------------|-----------|-------------|-----------|

49. Chondrichthyes is characterized by .....

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| (A) ventral mouth                   | (B) placoid scale                   |
| (C) ctenoid scale and ventral mouth | (D) placoid scale and ventral mouth |

50. Air bladder is absent in \_\_\_\_\_

- |              |           |          |                 |
|--------------|-----------|----------|-----------------|
| (A) Dog fish | (B) catla | (C) Pohu | (D) flying fish |
|--------------|-----------|----------|-----------------|

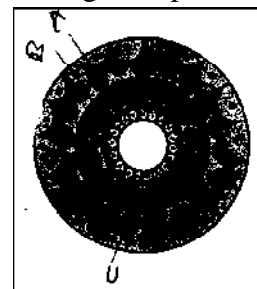
51. Choose the correct combination of the given option.

- |                                 |                                   |
|---------------------------------|-----------------------------------|
| (A) A = Torpedo - poison sting  | (B) A = Torpedo - electric organs |
| B = Sting rat - electric organs | B = string rat - posion sting     |
| C = Rohu - air bladder          | C = air bladder                   |

- (C) A = Torpedo - electric organs  
 B = Sting rat - electric organs  
 C = Rohu - poison sting
- (D) A = Torpedo - poison sting  
 B = sting rat - air bladder  
 C = Rohu - electric organs
52. Sea horse is \_\_\_\_\_  
 (A) a bird (B) a mammul (C) an amphibian (D) a fish
53. Terminal mouth occur in  
 (A) catla (B) Electric ray (C) shark (D) sting ray
54. Which of the following is oviparous fish ?  
 (A) shark (B) sea horse (C) catla (D) all the above
55. The scaleless vertebrate is  
 (A) snake (B) Rohu (C) shark (D) rat
56. They are cold-blooded animal  
 (A) horse (B) sea-horse (C) bat (D) crane
57. Amphibia means .....  
 (A) A = amphi = dual (B) A = amphi = water (C) A = Amphi = single (D) A = amphi = land  
 B = bios = life B = bios = life B = bios = life B = bios = life
58. The limbless amphibians is  
 (A) Tree fog (B) Toad (C) Pana (D) Ichthyophis
59. .... open into a common chamber called cloaca  
 (A) Alimentary canal (B) reproductive tract (C) urinary (D) all the above
60. Choose the correct combination of the given option  
 (A) Rana - Frog (B) Ichthyophis - Toad  
 (C) Hyla - Salamander (D) salamander - toad
61. Which type of Respiratory is/are found in amphibians  
 (A) gills (B) lungs (C) skin (D) all of the obove
62. Dry skin with scales or scutes without gland is a characteristic of  
 (A) Aves (B) pisces (C) Reptilia (D) mammals
63. A four chambered heart is not found in  
 (A) mammals (B) crocodile (C) birds (D) snake
64. They do not have external \_\_\_\_\_ opening in reptilla  
 (A) Nose (B) Jaws (C) Ear (D) scale
65. Which animals of the following reptile is poisonous ?  
 (A) Turtle (B) Tree lizard (C) Crocodile (D) krait
66. Choose the correct combination of the given option ?  
 (A) calotes - garden lizard (B) chameleon - krait  
 (C) Naja - viper (D) crocodilus - tortoise
67. Which of the following is a fightless bird ?  
 (A) pigeon (B) vulture (C) parrot (D) ostrich
68. The hind limb generally have ..... in Aves  
 (A) nail (B) scales (C) wing (D) joint skin

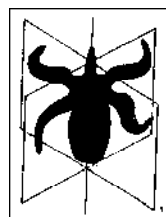


69. The hind limbs are modified for \_\_\_\_\_ in Aves.  
 (A) walking (B) swimming (C) clasping (D) all of the above
70. Which of the following is present on the skin of bird  
 (A) wax gland (B) oil gland (C) Hormonal gland (D) green gland
71. Endoskeleton is full A and the long bones are hollow with B in birds.  
 (A) A = cartilage (B) A = Bony  
           B = air cavities (C) B = air cavities  
 (C) A = Bony (D) A = cartilage  
           B = air bladder (E) B = air balloons
72. Gizzard is associated with \_\_\_\_\_ in birds  
 (A) Reproductive system (B) Digestive system  
 (C) circulatory system (D) skeletal system
73. The blood of Aves is  
 (A) warm (B) cold (C) warm and cold (D) semi worm
74. Which is correct for birds ?  
 (A) Air sacs (B) Mammary gland (C) tail (D) viviparous
75. Air sacs is connected to \_\_\_\_\_ in birds  
 (A) wings (B) Bone (C) lungs (D) limbs
76. Mammary gland are found in  
 (A) Aves (B) Mammalia (C) Amphibian (D) Reptile
77. Which one of the following mammalia live in water  
 (A) Bat (B) platypus (C) pat (D) Blue whole
78. Which mammalian have adapted to Fly ?  
 (A) Fox (B) penguin (C) ostrich (D) all of the above
79. Different types of teeth are present in the jaw in \_\_\_\_\_  
 (A) crocodile (B) snake (C) Frog (D) Human
80. Which is correct for mammalia.  
 (A) A = macropus = kangaroo (B) A = canis = dog  
           B = camelus = cameleon (C) B = fells = cat  
 (C) A = equus = rat (D) A = camelus = cameleon  
           B = leo = lion (E) B = canis = cat
81. When any plane passing through the central axis of the body divides the organism in to two identical halves, it is called \_\_\_\_\_  
 (A) asymmetrical (B) radial symmetry (C) bilateral symmetry (D) all of the above
82. Choose the correct combination for the labelling in the diagram from the given option.



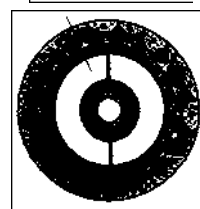
83. Symmetry observed in diagram is \_\_\_\_\_

- (A) Bilateral
- (B) Radial
- (C) Asymmetrical
- (D) all of the above



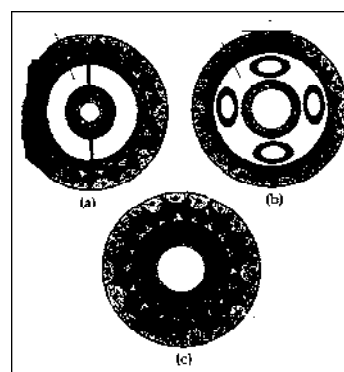
84. In the given diagram, what does 'A' represent

- (A) cavity
- (B) gut
- (C) coelom
- (D) pseudocoelom



85. In the given diagram, what does 'A', 'B', 'C' represent ?

- (A) A = Coelomate  
B = Pseudocoelomate  
C = Acoelomate
- (B) A = Coelomate  
B = Acoelomate  
C = Pseudocoelomate
- (C) A = Pseudocoelomate  
B = Pseudocoelomate  
C = Acoelomate
- (D) A = Acoelomate  
B = Coelomate  
C = Pseudocoelomate



86. The radial symmetry is observed in

- |                    |                   |
|--------------------|-------------------|
| I. Platyhelminthes | II. Coelenterates |
| III. Aschelminthes | IV. Annelids      |
| V. Echinoderms     |                   |
- (A) II, III, and V
  - (B) I, II, III, V
  - (C) II, III, I
  - (D) II and V
  - (e) II & V

**A And R type MCQ :(Question No. 87 to 105 are assertion and reason type)**

**Options for que no. 87 to 105**

- (A) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (B) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (C) Assertion is true but reason is false
- (D) Both Assertion and Reason are false.
- (e) Assertion is false but reason is true.

87. A = Sponges have a water transport or canal system.

R = The body is supported by skeleton made up of  $\text{CaCO}_3$  in porifera.

88. A = Coclenterata have central gastro - vascular cavity with a single opening mouth on hypos-  
tome.  
R = Cnidarians exhibit two basic body forms called polyp and Medusa
89. A = Sucker is present in the parasitic forms in liver fluke.  
R = They absorb nutrients from the host.
90. A = The body of the Aschelminthes is circular in cross-section.  
R = They also known as round worms
91. A = Fertilisation is internal and development may be direct or indirect in round worm.  
R = Females are longer than males
92. A = Aquatic annelids like Nereis possess lateral appendages, parapodia.  
R = Which help in swimming
93. A = Arthropods have Respiratory organs like gills, book gills, book lungs or tracheal system.  
R = Excretion takes place through malpighion tubule in Arthropods.
94. A = Arthropoda is the largest phylum of Animalia which includes insects.  
R = Over two-thirds of all named species on earth are arthropods.
95. A = Body is covered by a calcareous shell in mollusca.  
R = Molluscan have hard skeleton
96. A = The space between the hump and the mantle is called the mantle cavity in which feather like  
gills are present.  
R = They have respiration and excretory functions.
97. A = Water vascular system is found in Aves  
R = They help in blood circulation
98. A = Excretory organs is gills in Balanusoglossus  
R = Respiration takes place through proboscis
99. A = Phylum chordata is divided into three subphylum.  
R = They have urochordata, cephalochordata and vertebrata
100. A = Cyclostomata have an elongated body bearing 6-15 pairs of gill slits.  
R = They help in digestion
101. A = Heart is three chambered in cartilaginous fishes.  
R = One auricle and two ventricle
102. A = As the name indicates (Amphi = single, bios = life) in Amphibians  
R = Amphibians can live in aquatic as well as terrestrial habitats.
103. A = Heart is usually three chambered in reptilia.  
R = Heart is two chambered in crocodiles
104. A = The hind limbs generally have scales and are modified for walking, swimming or clasping.  
R = The short bones are hollow with possess air cavities.
105. A = The most unique mammalian characteristic is the presence of milk producing glands.  
R = They have two pairs of limbs, adapted for walking, running, climbing, burrowing swimming  
and flying.

**Competitive Exam MCQ :**

106. Classification of sponges is primarily based on the (JCECE-2003)  
 (A) body organization (B) body plan (C) skeleton (D) canal system
107. Symmetry in cnidaria is (AMW-2009)  
 (A) radial (B) bilateral (C) pentamerous (D) spherical
108. Cavity of coelenterates is called (BHU-2008)  
 (A) coelenteron (B) coelom (C) cavity (D) none of these
109. Sea anemone belongs to phylum (BCECE-2005)  
 (A) protozoa (B) porifera (C) coelenterata (D) echinodermata
110. Medusa is the reproductive organ of (BHU-2008)  
 (A) Hydra (B) Aurelia (C) Obelia (D) sea anemone
111. The excretory cells, that are found in platyhelminthes. (J & K CET- 2007)  
 (A) Protonephridia (B) flame cells (C) Solenocytes (D) All of these
112. In which of the following organisms, self fertilization is seen. (CCET-2007)  
 (A) fish (B) Round worm (C) Earthworm (D) Liver fluke
113. Nephridia of Earthworms are performing same functions as (J & K CET-2003)  
 (A) gills of prawn (B) flame cells of planaria  
 (C) trachea of insects (D) nematoblasts of Hydra
114. Phylum of Taenia Solium is (BCECE-2004)  
 (A) Aschelminthes (B) Annelids (C) platyhelminthes (D) mollusca
115. Ascaris is found in (RPMT-2004)  
 (A) body cavity (B) lymph nodes (C) tissue (D) alimentary canal
116. Which of the following animals has a true coelom ? (J & K CET-2007)  
 (A) Ascaris (B) Pheretima (C) Sycon (D) Taenia solium
117. Metameric segmentation is the main feature of (Punjab PMET)  
 (A) Annelida (B) Echinodermata (C) Arthropoda (D) Coelenterata
118. In Pheretima locomotion occurs with help of  
 (A) circular muscles (B) longitudinal muscles and setae  
 (C) parapodia (D) circular, longitudinal muscles and setae
119. Body cavity lined by mesoderm is called (J & T CET-2005)  
 (A) coelenteron (B) pseudocoel (C) coelom (D) blastocoel
120. Which of the following have the highest number of species in nature ? (CBSE AIPMT-2011)  
 (A) Insects (B) Birds (C) Angiosperms (D) Fungi
121. Which of the following is a crustacean ? (Guj-CET-2011)  
 (A) prawn (B) snail (C) sea anemone (D) Hydra
122. The respiratory pigment present in cockroach is (OJEE-2010)  
 (A) Haemoglobin (B) Haemocyanin (C) oxyhaemoglobin (D) None of these
123. Book lungs are respiratory organs in (AMU-2008)  
 (A) Insects (B) Arachnids (C) Molluscans (D) Echinoderms
124. The excretory organ in cockroach is (Kerala-CEE-2007)  
 (A) Malpighian corpuscle (B) Malpighian tubules  
 (C) green gland (D) Metanephridia

125. Exoskeleton of which phylum consists of chitinous cuticle ? (J & K CET-2007)  
 (A) Annelida (B) porifera (C) Arthropoda (D) Echinodermata
126. In cockroach, vision is due to (Punjab PMET-2005)  
 (A) one compound eye (B) two compound eyes  
 (C) two simple eyes (D) two compound and two simple eyes.
127. Which of the following is an insect ? (GUJ-CET)  
 (A) Moth (B) mites (C) prawn (D) scorpion
128. Which of the following respire through gill ? (J & K CET-2005)  
 (A) whale (B) Turtle (C) frog (D) Prawns
129. Animals which active at night are called. (J & K CET-2004)  
 (A) diurnal (B) nocturnal (C) parasites (D) nocto-diurnal
130. Salient feature of Arthropoda is (RPMT-2003)  
 (A) aquatic and free living (B) chitinous exoskeleton and jointed appendages  
 (C) Radulla (D) None of those
131. The second largest number of species containing phylum in the animal kingdom is (J & K CET-2008)  
 (A) Annelida (B) Arthropoda (C) Mollusca (D) Chordata
132. Mollusca is (JCECE-2006)  
 (A) Triploblastic, acoelomate (B) Triploblastic, coelomate  
 (C) Diploblastic, acoelomate (D) Diploblastic, coelomate
133. Tube feet are the locomotory organs of (OJEE-2010)  
 (A) platyhelminthes (B) Echinodermata (C) Mollusca (D) Arthropoda
134. Arms are absent in (Haryana PMJ-2007)  
 (A) Seaurchin (B) Sea cucumber (C) Both a & b (D) None of these
135. Scientific name of starfish is (Amu-2004)  
 (A) Echinus (B) Limulus (C) Echidna (D) Asterias
136. The echinoderms are (BHU-2005)  
 (A) Arboreal insects (B) Marine animals (C) terrestrial insects (D) freshwater worms
137. In Echinoderms, tube feet are related with (AMU-2004)  
 (A) locomotion (B) excretory system (C) respiratory system (D) reproductive system
138. Lateral line sense organs occur in (MHT CET-2004)  
 (A) salamander (B) frog (C) water snake (D) scoliodon
139. The jawless vertebrate is (Kerala CEE-2004)  
 (A) crocodile (B) zoris (C) Hyla (D) fox  
 (e) Petromyzon
140. Air bladder occurs in (Haryana PMT-2006)  
 (A) Torpedo (B) Anabus (C) Scoliodon (D) Elasmobranch
141. The limbless amphibian is (Kerala - CEE-2011)  
 (A) Ict thyophis (B) Hyla (C) Rana (D) Salamander  
 (e) Bufo
142. Salamander can regenerate (AMU-2003)  
 (A) tail (B) limbs (C) external gills (D) all of those

143. In which of the following reptiles, four chambered heart is present ? (JCECE-2003)  
 (A) Lizard (B) Snake (C) Scorpion (D) Crocodile
144. Which of the following snake is non-poisonous ? (RMPT-2011)  
 (A) cobra (B) krait (C) viper (D) python
145. Which of the following is a flightless bird ? (UPCPMT-2011)  
 (A) ostrich (B) Emu (C) kivi (D) All of those
146. Right aortic arch is present in (Manipal-2005)  
 (A) reptiles only (B) Mammals only (C) birds only (D) both b and c
147. Mammal's heart is (RMPT-2011)  
 (A) Myogenic (B) neurogenic (C) voluntary (D) sympathetic
148. The second largest aquatic vertebrate is (J & K CET-2008)  
 (A) blue whale (B) whale shark (C) sea elephant (D) dugong
149. Which one is not correct ? (Haryana-PMT-2005)  
 (A) Humans-Ureotelic (B) Birds-Uricotelic  
 (C) Lizards - Uricotelic (D) Whale - Ammonotelic
150. An egg laying mammals is (J & K CET-2008)  
 (A) Delphinus (B) Macacg (C) ornithorhynchus (D) macrolus
151. The long bones are hollow and connected by air passage these are characteristic of (AMU-2006)  
 (A) Mammalia (B) Aves (C) Poptilia (D) Sponges





## ANSWER KEY

1. (B)	2. (A)	3. (C)	4. (B)
5. (C)	6. (B)	7. (B)	8. (D)
9. (D)	10. (A)	11. (A)	12. (B)
13. (D)	14. (B)	15. (B)	16. (A)
17. (B)	18. (B)	19. (C)	20. (D)
21. (C)	22. (B)	23. (D)	24. (C)
25. (D)	26. (A)	27. (D)	28. (A)
29. (C)	30. (C)	31. (D)	32. (B)
33. (A)	34. (B)	35. (B)	36. (C)
37. (D)	38. (D)	39. (A)	40. (B)
41. (C)	42. (D)	43. (A)	44. (C)
45. (A)	46. (D)	47. (A)	48. (C)
49. (D)	50. (A)	51. (B)	52. (D)
53. (A)	54. (D)	55. (D)	56. (B)
57. (A)	58. (D)	59. (D)	60. (A)
61. (D)	62. (C)	63. (D)	64. (C)
65. (D)	66. (A)	67. (D)	68. (B)
69. (D)	70. (B)	71. (B)	72. (B)
73. (A)	74. (A)	75. (C)	76. (B)
77. (D)	78. (A)	79. (D)	80. (B)
81. (B)	82. (B)	83. (B)	84. (C)
85. (A)	86. (C)	87. (C)	88. (B)
89. (A)	90. (A)	91. (B)	92. (A)
93. (B)	94. (A)	95. (A)	96. (A)
97. (D)	98. (D)	99. (A)	100. (C)
101. (D)	102. (C)	103. (C)	104. (C)
105. (B)	106. (C)	107. (A)	108. (A)
109. (C)	110. (B)	111. (B)	112. (D)
113. (B)	114. (C)	115. (D)	116. (B)
117. (A)	118. (C)	119. (C)	120. (A)
121. (A)	122. (D)	123. (B)	124. (B)
125. (C)	126. (B)	127. (A)	128. (D)
129. (B)	130. (B)	131. (C)	132. (B)
133. (B)	134. (C)	135. (D)	136. (B)
137. (A)	138. (D)	139. (C)	140. (B)
141. (A)	142. (C)	143. (D)	144. (D)
145. (D)	146. (C)	147. (A)	148. (B)
149. (D)	150. (C)	151. (B)	

## Unit-II

### Chapter-5. Plant Anatomy Plant Tissues

#### IMPORTANT POINTS

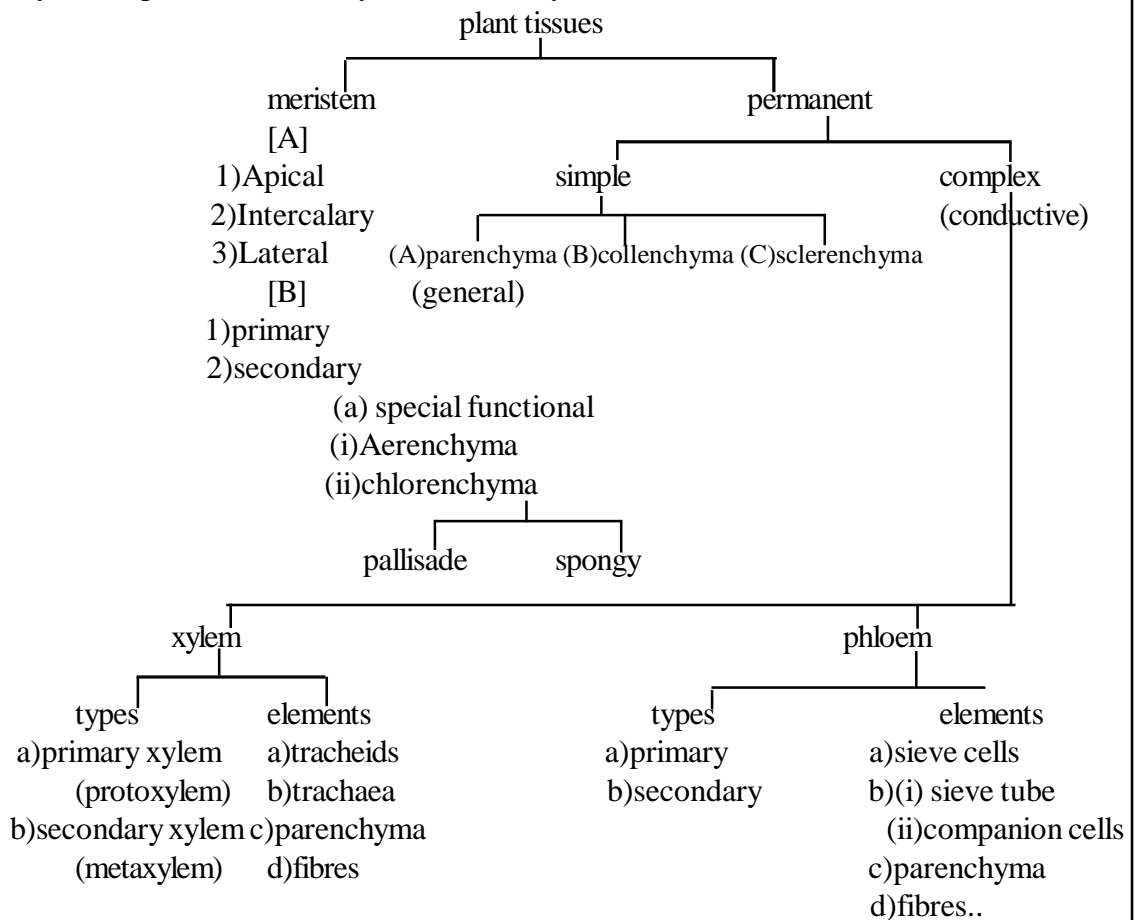
The plant body is made up of cells. cells are organized to form tissues, tissue system and organs in a sequential organization.

Study of the internal structural organization of plant organs is known as plant anatomy.

Two groups of the angiosperms i.e. Dicot and monocot show different anatomical composition.

Tissue : Tissue is a group of cells having a common origin, which are grouped together to perform specific functions.

Plant body shows presence of variety of tissues. They are classified as follows.



- plant tissues are of two types (1) meristematic and (2) permanent
  - meristematic tissues consists of actively dividing cells.
  - Based on their location, they are of 3 types
- 1) Apical meristem
  - 2) Intercalary meristem

3) Lateral meristem

- Apical meristem and Intercalary meristems, as they appear early in the life of plant and contribute to the formation of primary plant body, they are considered primary meristem.
- Secondary meristematic tissue : the meristems that occurs in the mature regions of shoots and roots of many plants and appear later than primary meristem is called secondary or lateral meristem.
- cells of permanent do not possess the property of cell division and these tissues are structurally and functionally specialized.
- permanent tissues are of two types  
(a) simple and (b) complex (conductive)
- simple permanent tissues consists of similar types of cells.
- They are divided into 3 types.  
(a) parenchyma (b) collenchyma (c) sclerenchyma
- While complex tissues is a group of more than one type of cells, working together as a unit to perform definite functions.
- they are of two types.  
(a) Xylem and (b) phloem
- Xylem is concerned with transportation of water and minerals.
- Phloem transports nutritive substance.

**Anatomy of plant organs :-**

- Three types of tissues systems are found in plant organs like root, stem and leaf.
- (a) Epidermal tissue system
- (b) Ground tissue system
- (c) Vascular tissue system
- In most of the dicotyledons, after completion of the primary growth, further increase in girth (diameter) takes place due to formation of secondary tissues. The length wise growth of organs is due to apical meristem.
- the secondary growth involves lateral meristems like vascular cambium or cork cambium.

- (1) Which of the following is an example of lateral meristem.  
(A) pith (B) cambium (C) Xylem (D) cortex
- (2) The region in apical meristem develops into..  
(A) Endodermis (B) Pericycle  
(C) Epidermis (D) Vascular tissue
- (3) Hydathodes are component of  
(A) Vascular tissue system (B) Ground tissue system  
(C) Epidermal tissue system (D) Cortex tissue system

- (4) Which of the following is a living structure?  
 (A) Sclerenchyma (B) Parenchyma  
 (C) Xylem vessel (D) Tracheid
- (5) In collenchyma, the thickening of corners is made of  
 (A) Pectin (B) Lignin  
 (C) Suberin (D) Resin
- (6) Sclereids are also known as  
 (A) Accessory cells (B) Companion cells  
 (C) Stone cells (D) Guard cells
- (7) Collenchyma constitute the hypodermis in.  
 (A) Monocot root (B) Dicot Stem  
 (C) Dicot root (D) Monocot Stem
- (8) Cuticle is always present on the surface of  
 (A) Root (B) Leaf only  
 (C) Stem only (D) Leaf and stem both
- (9) Companion cells are found in  
 (A) Xylem (B) Stomata  
 (C) Phloem (D) Endodermis
- (10) The element of xylem in which end walls are absent are called  
 (A) Protoxylem (B) Tracheids  
 (C) Metaxylem (D) Tracheae
- (11) Which type of thickening is found in protoxylem.  
 (A) Reticulated (B) Spiral  
 (C) Pitted (D) Scleriform
- (12) Sieve tube is characterized by  
 (A) Presence of lignin (B) Absence of Cytoplasm  
 (C) Presence of Pectin (D) Absence of Nucleus
- (13) Which of the following element of xylem is living.  
 (A) Tracheae (B) Tracheids  
 (C) Parenchyma (D) fibres
- (14) Safranin stains.  
 (A) Thick walled cells (B) Lignified cells  
 (C) Suberized cells (D) Living cells
- (15) Radial V.B. are found in  
 (A) Leaf (B) Stem  
 (C) Flower (D) Root
- (16) Which of the following is a food synthesising tissue.  
 (A) Chlorenchyma (B) Sclerenchyma  
 (C) Chornchyma (D) Aerenchyma

- (17) Cucurbita stem shows  
 (A)Radial Vascular bundle (B)Collateral Vascular bundle  
 (C)Conjoint Vascular bundle (D)Bicollateral Vascular bundle
- (18) In monocot leaves, the mesophyll Consists of  
 (A)Aerenchyma (B)Only Spongy chlorenchyma,  
 (C)Only Pallisade (D)Pallisade and Spongy Chlorenchyma
- (19) In stem, the xylem shows.  
 (A)Tetrach arrangement (B)Endarch development  
 (C)Polyarch arrangement (D)Exarch development
- (20) In monocot stem the vascular bundles are  
 (A)Arranged in a ring (B)Arranged alternatively  
 (C)Present inside endodermis (D)Scattered in ground tissue
- (21) Exarch condition of xylem is found only in  
 (A)Leaf (B)Root  
 (C)Flower (D)Stem
- (22) Endodermis is always absent in  
 (A)Monocot root (B)Dicot root  
 (C)Monocot stem (D)Dicot stem
- (23) Which tissue is called a living mechanical tissue  
 (A)Parenchyma (B)Collenchyma  
 (C)Aerenchyma (D)Chlorenchyma
- (24) Collenchyma Shows deposition of  
 (A)Pectin (B)Suberin  
 (C)Resin (D)Lignin
- (25) In Which tissue deposition is seen outside the cells ?  
 (A)Sclerenchyma (B)Xylem  
 (C)Collenchyma (D)Phloem
- (26) Lignin is absent in  
 (A)Stone cells (B)Sclerenchymatous fibres  
 (C)Tracheids (D)Sieve cells
- (27) Bulliform cells are found in the leaves of  
 (A)Sunflower (B)Nerium  
 (C)Maize (D)Lotus
- (28) In hydrophytes, stomata are  
 (A)Not required (B)Seen only on upper epidermis  
 (C)Absent or rudimentary (D)Seen only on lower epidermis

- (29) Casparian Strips are found p on the  
 (A)Walls of pericycle cells (B)Walls of endodermal cells  
 (C)Walls of epidermal cells (D)Walls of bundle sheath cells
- (30) Which tissue provides elasticity to the young branches of the stem ?  
 (A)Collenchyma (B)Aerenchyma  
 (C)Parenchyma (D)sclerenchyma
- (31) Which tissue provides mechanical Strength as well as bayouncy support to the plant ?  
 (A) Sclerenchyma (B) Meristem  
 (C) Parenchyma (D) Chlorenchyma
- (32) Which tissue is always absent in root ?  
 (A)Sclerenchyma (B)Meristematic  
 (C)Parenchyma (D)Collenchyma
- (33) Which tissue is absent in monocot ?  
 (A)Meristem (B)Xylem  
 (C)Collenchyma (D)Phloem
- (34) Which simple permanent tissue is formed of dead cells. ?  
 (A)Collenchyma (B)Sclerenchyma  
 (C)Aerenchyma (D)Xylem
- (35) Stele remain covered by  
 (A)Pericycle (B)Cortex  
 (C)Endodermis (D)Conjunctive tissue
- (36) Which tissue is responsible for the increase in the length of the plant ?  
 (A)Lateral meristem (B)Apical meristem  
 (C)Intercalary meristem (D)Cambium
- (37) The dead element of the phloem is  
 (A)Sieve cells (B)Companion cells  
 (C)Sieve tube (D)Phloem fibre
- (38) Which cells regulate the function of sieve tube ?  
 (A)Guard cells (B)Passage cells  
 (C)Companion cells (D)Bulliform cells
- (39) Root hair is always  
 (A)Very long (B)Multi cellular  
 (C)Cuticularized (D)Unicellular
- (40) The central Region of the stem and root is known as  
 (A)Pericycle (B)Medulla (pith)  
 (C)Endodermis (D)Cortex
- (41) Close type of vasular bundle lacks  
 (A)Xylem (B)Sclerenchyma  
 (C)Phloem (D)Cambium

- (42) Lysigenous cavity is found  
 (A) In the cortex (B) Between xylem and phloem  
 (C) Beneath Protoxylem (D) Beneath metaxylem
- (43) The lateral meristem increases the  
 (A) Height of the plant (B) Thickness of trunk  
 (C) Size of the leaf (D) Branches of root
- (44) Conjoint, collateral and open vascular bundles are found in  
 (A) Monocot Stem (B) Monocot leaf  
 (C) Dicot Stem (D) Dicot root
- (45) In leaf protxylem is directed towards  
 (A) Lower epidermis (B) Phloem  
 (C) Stomata (D) Upper epidermis
- (46) Lenticels are associated with  
 (A) Absorption of moisture (B) Photosynthesis  
 (C) Gaseous Exchange (D) Mineral uptakes
- (47) Passage calls are found in  
 (A) Endodermis (B) Pericycle  
 (C) Hypodermis (D) Epidermis
- (48) Sieve plate and Sieve pores are located in the  
 (A) Lateral wall of sieve cells (B) Wall of companion cells  
 (C) End wall of sieve tube (D) End wall of sieve cells
- (49) Pericycle is formed of  
 (A) Collenchyma (B) Parenchyma  
 (C) Chlorenchyma (D) Conjunctive tissue
- (50) Which cells regulate the opening and closing of stomata  
 (A) Passage cells (B) Guard cells  
 (C) Companion cells (D) Epidermal cells
- (51) Pericycle is always located inside the  
 (A) Epidermis (B) Endodermis  
 (C) Hypodermis (D) Lower Epidermis
- (52) In endarch development of xylem the protoxylem is directed towards  
 (A) Endodermis (B) Centre  
 (C) Epidermis (D) Phloem
- (53) Sclerenchymatous hypodermis is found in  
 (A) Dicot root (B) Monocot leaf  
 (C) Dicot stem (D) Monocot stem
- (54) Which of the following cells is living but it is without nucleus.  
 (A) Sieve cells (B) Companion cells  
 (C) Sieve tube (D) Guard cells



- (55) Casperian strip is made up of  
 (A)Cutin and lignin (B)Lignin and cellulose  
 (C)Lignin and suberin (D)Cutin and suberin
- (56) Secondary meristem gets activated from-  
 (A)Primary meristem (B)Mature permanent tissue  
 (C)Apical meristem (D)Intercalary meristem
- (57) In dicot leaves the vascular bundles are-  
 (A)conjoint,open (B)Radial,closed  
 (C)conjoint,closed (D)Radial,open
- (58) Companion cells are  
 (A)Living and non-nucleated (B)Dead and non-nucleated  
 (C)Dead but nucleated (D)Living and nucleated
- (59) The last produced secondary xylem remains located near -  
 (A)Medulla (B)Primary phloem  
 (C)Cambium ring (D)Primary xylem
- (60) Which of the following is absent in the phloem of monocots ?  
 (A)Companion cells (B)Phloem parenchyma  
 (C)Sieve cell (D)Phloem sclerenchyma
- (61) In maize stem the vascular bundles are -  
 (A)Arranged in a ring (B)Scattered-irregularly  
 (C)Arranged in two ring (D)Scattered but smaller towards periphery
- (62) In T.S. the tracheid appears-  
 (A)Square (B)Round  
 (C)Polygonal (D)Oval
- (63) In T.S. the trachea appears-  
 (A)Isodiametric (B)Pentagonal  
 (C)Circular (D)Hexagonal
- (64) In trachea the end walls are  
 (A)Continuous (B)Thick  
 (C)Discontinuous (D)Absent
- (65) Compared to the diameter of metaxylem the diameter of protoxylem is -  
 (A)Larger (B)Smaller  
 (C)Broader (D)Angular
- (66) The ends of tracheids are  
 (A)Projected (B)Flat  
 (C)Perforated (D)Wall less
- (67) What is the normal appearance of stone cells ?  
 (A)Hexagonal (B)Round  
 (C)Isodiametric (D)Oval

- (68) Stem has always-
- (A) Exarch xylem (B) Scattered V.B.  
(C) Arranged V.B. (D) Endarch xylem
- (69) Root has always
- (A) Endarch xylem (B) Tetrach stele  
(C) Exarch xylem (D) Palyarch stele.
- (70) Growth rings are produced due to activity of -
- (A) Extrastealar cambium (B) Interstealar cambium  
(C) Intrastealar cambium (D) b & c both
- (71) Companion cell regulates the activities of -
- (A) sieve cell (B) sieve elements  
(C) sieve tube (D) sieve plates
- (72) Match column I and column II
- | Organs             | vascular bundle           |
|--------------------|---------------------------|
| (p) Maize stem     | (1) Bicollateral and open |
| (q) Cucurbita stem | (2) Radial                |
| (r) Sunflower stem | (3) Conjoint and closed   |
| (s) Maize root     | (4) Conjoint and open     |
- (A) (p-1) (q-4) (r-3) (s-2)  
(B) (p-2) (q-3) (r-1) (s-4)  
(C) (p-3) (q-1) (r-4) (s-2)  
(D) (p-3) (q-4) (r-2) (s-1)
- (73) Phelloderm is formed of
- (A) Phellem + phellogen (B) Periderm + phellogen  
(C) Phellem + periderm (D) Periderm-phellogen and phellem
- (74) The tissue in roots which acts as check dam against water is-
- (A) Hypodermis (B) Passage cells  
(C) Endodermis (D) Pericycle.
- (75) Companion cell is-
- (A) Dead (B) Enucleated  
(C) Living and thickened (D) Nucleated
- (76) Which one of the following is an internal secretory structure ?
- (A) Passage cell (B) Lysigenous cavity  
(C) Resin duct (D) Stone cell
- (77) In roots the lateral root originates from-
- (A) Cortex (B) Endodermis  
(C) Epidermis (D) Pericycle

(78) What is produced from periblem ?

- |               |                |
|---------------|----------------|
| (A) Epidermis | (B) Endodermis |
| (C) Cortex    | (D) Hypodermis |

(79) Match column I with column II

Tissue	Function
(1) PArenchyma	(a) Increase in length of plants
(2) Lateral meristem	(b) Increase in nodal region
(3) Apical meristem	(c) support,protection,storage
(4) Intercalary meristem	(d) Increase in diametre of trunk
(A)(1-d) (2-c) (3-b) (4-a)	(B)(1-c) (2-d) (3-a) (4-b)
(C)(1-a) (2-b) (3-d) (4-c)	(D)(1-c) (2-a) (3-d) (4-b)

(80) Tissue Deposition

(a) Trachaea	(1) callose
(b) parenchyma	(2) pectin
(c) sieve cell	(3) lignin
(d) collenchyma	(4) cellulose
(A)(a-1) (b-2) (c-3) (d-4)	(B)(a-3) (b-1) (c-4) (d-2)
(C)(a-3) (b-4) (c-1) (d-2)	(D)(a-2) (b-3) (c-1) (d-2)

(81) Tissue Function

(p) Chlorenchyma	(i) Strength, Support
(q) sclerenchyma	(ii) Bouyoncy, Support
(r) Aerenchyma	(iii) Growth
(s) Meristem	(iv) Photosynthesis
(A) (p-(iii)) , (q-(i)) , (r-(ii)) , (s-(iv))	(B) (p-(ii)) , (q-(iv)) , (r-(i)) , (s-(iii))
(C) (p-(iv)) , (q-(i)) , (r-(ii)) , (s-(iii))	(D) (p-(i)) , (q-(iii)) , (r-(ii)) , (s-(iv))

(82) Match column I with column II

Specific Structure	Location
(p) Resin duct	(i) Maizestem Vascularbundle
(q) Lysigenious cavity	(ii) Maize leaf-uppear epidermis
(r) Passage cell	(iii) sunflower stem cortex
(s) Motor cells	(iv) Sunflower root endodermis
(A) (p-(i)) , (q-(iv)) , (r-(ii)) , (s-(iii))	(B) (p-(iii)) , (q-(i)) , (r-(iv)) , (s-(ii))
(C) (p-(ii)) , (q-(iii)) , (r-(i)) , (s-(iv))	(D) (p-(iii)) , (q-(ii)) , (r-(iv)) , (s-(i))

(83) Epidermis of plant organs is mostly made up of

- |                 |                 |
|-----------------|-----------------|
| (A) Sclernchyma | (B) Parenchyma  |
| (C) Meristem    | (D) Collenchyma |

(84) The region of stele begins with-

- |                |                |
|----------------|----------------|
| (A) Cortex     | (B) Parenchyma |
| (C) Endodermis | (D) Pericycle  |

- (85) Endodermis is a part of  
 (A) Hypodermis (B) Cortex  
 (C) Stele (D) Pith
- (86) The hygroscopic cells of maize leaf are laterally covered by-  
 (A) Hair (B) Curved trichomes  
 (C) Guard cell (D) Companion cell
- (87) In maize stem, the peripherally located vascular bundle are normally :-  
 (A) Large in size (B) Well organized  
 (C) Small in size (D) Less organized
- (88) Cortex consists of three zones except-  
 (A) Epidermis (B) Main cortex  
 (C) Hypodermis (D) Endodermis
- (89) When cambium is present, the vascular bundle is called-  
 (A) Close (B) Radial  
 (C) Open (D) Conjoint
- (90) In collateral vascular bundle, the phloem is present  
 (A) Inside the xylem (B) Lateral side of xylem  
 (C) on both sides of xylem (D) Outside the xylem
- (91) If one conducting tissue completely surrounds another one, the vascular bundle is called  
 (A) Bi-collateral (B) Concentric  
 (C) Collateral (D) Radial
- (92) Which tissue is always present in the ground tissue of root and stem of all plants  
 (A) Collenchyma (B) Sclerenchyma  
 (C) Chlorenchyma (D) Parenchyma
- (93) Which of the following cells are without cytoplasm and nucleus?  
 (A) Guard cells (B) Stone cells  
 (C) Companion cells (D) Sieve cells
- (94) Raphides are the crystals of  
 (A) Calcium oxalate (B) Calcium carbonate  
 (C) Calcium phosphate (D) Calcium
- (95) Bulliform cells are present in  
 (A) Bundle sheath (B) Mesophyll tissue  
 (C) Vascular Bundle (D) Epidermis
- (96) Kranz anatomy is seen in  
 (A) Euphorbia hirta (B) Citrus indica  
 (C) Mangifera indica (D) Zea mays
- (97) The chief function of psloem is the conduction of  
 (A) Food (B) Mineral  
 (C) Water (D) Air

- (98) Casparian strips are the characteristics of  
 (A) Cortex (B) Endodermis  
 (C) Pericycle (D) Pith
- (99) The crystals of calcium carbonate, which appear like a bunch of grapes in epidermal cells of leaves of some plants, are called -  
 (A) Sphaeraphides (B) Raphides  
 (C) Otoliths (D) cytoliths
- (100) The vascular cambium and cork cambium are the examples of  
 (A) Apical meristem (B) Lateral Meristem  
 (C) Intercalary meristem (D) Permanent tissue
- (101) Secondary phloem remains functional generally  
 (A) Less than 1 year (B) More than 1 year  
 (C) For 1 year (D) As long as plant lives
- (102) Transverse section of a plant is stained with safranin and fast green what is the color of the phloem?  
 (A) Red (B) Green  
 (C) Pink (D) Orange
- (103) Root cap is formed by  
 (A) Dermatogen (B) Calyptogen  
 (C) Vascular cambium (D) Wood cambium
- (104) Passage cells are found in (2000)  
 (A) Dicot stem (B) Monocot root  
 (C) Aerial root (D) Monocot stem
- (105) The sugarcane plant has. (2004)  
 (A) Dumbbelled shaped guard cells  
 (B) Pentamerous flowers  
 (C) Reticulate venation  
 (D) Capsular fruits
- (106) In plant organ which is covered by periderm and in which the stomata are absent, Some gaseous exchange takes place through-  
 (A) Aerenchyma (B) Trichomes  
 (C) Pneumatophores (D) Lenticels
- (107) Companion cells are associated with  
 (A) Vessels (B) Male gamete  
 (C) Sieve tube (D) Guard cells
- (108) Cork cambium results in the formation of cork which becomes impermeable to water due to the accumulation of ---  
 (A) Resin (B) Suberin  
 (C) Starch (D) Tanin.
- (109) Which one of the following statements pertaining to plant structure is correct?

- (A) Cork lacks stomata, but lenticels carry out transpiration  
 (B) Passage cells help in transfer of food from cortex to phloem.  
 (C) Sieve tube elements possess cytoplasm but no nuclei.  
 (D) The short apical meristem has a quiescent centre.
- (110) In the sieve elements which one of the following is the most likely function of P-proteins?  
 (A) Deposition of callose on sieve plates  
 (B) Providing energy for active translocation  
 (C) Autolytic enzymes  
 (D) Sealing mechanism on wounding
- \* A+R type questions mark the correct choice -as
- (A) If both A and R are true and R is the correct explanation of A  
 (B) If both A and R are true but R is not the correct explanation of A  
 (C) If A is correct but R is false  
 (D) If both A and R are false
- (111) A : In woody stems the amount of heart wood continues to increase year after year  
 R: The activity of the cambial ring continues uninterrupted - (1999,2007)  
 (A) (B) (C) (D)
- (112) A: thick cuticle is mostly present in disease resistant plants  
 R: Disease causing agents can not grow on cuticle and cannot invade the cuticle (1997)  
 (A) (B) (C) (D)
- (113) A: Rhizobial aggregates have been observed at distinct sites on curled root hairs.  
 R: The infection thread is formed by a process of invagination of the hair cell walls in the region of curling. (1999)  
 (A) (B) (C) (D)
- (114) A: Vascular cambium is considered as lateral meristem.  
 R: It gives rise to lateral shoots (2000)  
 (A) (B) (C) (D)
- (115) A: Monocot stem consists of collateral open vascular bundles.  
 R: If cambium is present such vascular bundles are called closed type (2001)  
 (A) (B) (C) (D)
- (116) A: The collenchyma is thick walled living tissue.  
 R: The collenchyma is thickened due to the deposition of pectin.  
 (A) (B) (C) (D)

**ANSWER KEY**

1	b	40	b	79	b
2	d	41	c	80	d
3	c	42	d	81	c
4	b	43	c	82	b
5	a	44	a	83	c
6	c	45	c	84	a
7	b	46	b	85	c
8	d	47	b	86	d
9	c	48	b	87	b
10	d	49	b	88	d
11	b	50	d	89	b
12	d	51	c	90	a
13	c	52	c	91	d
14	b	53	b	92	d
15	d	54	c	93	a
16	c	55	d	94	b
17	d	56	c	95	d
18	b	57	b	96	b
19	a	58	d	97	c
20	d	59	c	98	c
21	b	60	c	99	b
22	c	61	d	100	b
23	b	62	b	101	c
24	a	63	a	102	a
25	c	64	c	103	d
26	d	65	d	104	c
27	c	66	c	105	b
28	c	67	d	106	c
29	b	68	c	107	d
30	a	69	c	108	a
31	c	70	c	109	a
32	d	71	d	110	a
33	c	72	c	111	
34	b	73	d	112	
35	c	74	c	113	
36	b	75	b	114	
37	d	76	d		
38	c	77	c		
39	d	78			



## Unit:- II

### Chapter-6. Animal Tissue

#### IMPORTANT POINTS

Tissue is the group of cells having similar structure & function. Animals contain 4 basic types of tissues which are :- epithelial tissue, connective tissue, muscular tissue and nervous tissue. Epithelial tissue can be derived from any of the three germinal layers. Epithelial tissues are of different types such as : Squamous, cuboidal, columnar, ciliated, pseudo-stratified, stratified, and transitional.

Functions of epithelial tissue : Protection, secretion & absorption. There are 3 types of connective tissues which are differentiated on the basis of extracellular material. Secreted by cells themselves. (a) Connective tissue proper- (soft jelly like matrix with fibres) - are of five types : areolar, adipose, white fibrous, tendon and legament.

(b) Skeletal tissue (Supportive connective tissue) includes cartilage and bones which form the endoskeleton of the vertebrate body. The Cartilages are classified in to four group : Hyaline, white fibrous, yellow elastic fibro cartilage and calcified cartilage.

(c) Blood (fluid connective tissue) is a fibre-free fluid extra cellular matrix.

It is a mobile connective tissue (Vascular/Fluid tissue). It is composed of plasma, blood cells and blood platlets. It is a opaque trubid fluid.

Blood cells are erythrocytes and Leucocytes. There are five types of leucocytes : neutrophils, eosinophils, basophils, monocytes and lymphocytes.

WBCs are colourless, nucleated found in blood (and lymph). Which are devoid of haemoglobin. They are capable of coming out of blood capillaries through the process of diapendesis. (i. e. Greek Word - diapendesis - leaping through)

(d) Muscular tissue (mostly mesodermal origin) is made up of elongated and contractive cells : called muscles cells or myocytes.

There are three types of Muscular tissue : Skeletal muscle (striated), non striated and cardiac,

. Myoglobin - Muscle haemoglobin

. Myoblasts - Muscle forming cells.

. Myology : study of all aspects of muscles & accessory structures .

(e) The nervous tissue it is composed of two types of cells - (a) neurons : (Nerve cells) are structural & functional unit, they transmit nerve impulses, (b) neuroglia. Neuron has one or more processes extending from it . (i) Axon - carries impulses away from the cell body.

(ii) dendrites (G.K. dendron tree) take nerve impulse to the cell body.

On the basis of number of processes, neurons are : unipolar, bipolar & multipolar.

The nerve fibres may be surrounded by two concentric sheath. The inner is known as medullary or myelin sheath.

Myelin is secreted by schwann cells in peripheral nerve fibres and oligodendrocytes in central Nervons system.



Schwann cells form the outer sheath called neurilemma (GK. neuron- nerve, lemna-skin).  
There is a physical gap between the nerve ending of axon and dendrites called synapse.

**For the given options select the correct options (a, b, c, d) each carries one mark.**

- Which of the following structure are made of several layer's of cells :-  
(A) Ciliated epithelium (B) Stratified epithelium  
(C) Cuboidal epithelium (D) Columnar epithelium
- Which simple epithelium tissue cells are square in vertical sections and Polygonal in horizontal section  
(A) Columnar epithelium (B) Squamous epithelium  
(C) Cuboidal epithelium (D) Ciliated epithelium
- Which of the following structure is not covered by epithelial tissue :-  
(A) Blood vessels (B) Digestive gland  
(C) Skin (D) Cartilage
- Which type of epithelium is present in the inner lining of large bronchi :-  
(A) Squamous epithelium (B) Pseudo - stratified epithelium  
(C) Cuboidal epithelium (D) Columnar epithelium
- Which of the following is arranged in a single layer :-  
(A) Stratified epithelium (B) Pseudo-stratified epithelium  
(C) Ciliated epithelium (D) Transitional epithelium
- Which tissue is located in uterine tube and proximal tube of kidneys respectively :-  
(A) Columnar epithelium, Cuboidal epithelium (B) Ciliated epithelium, columnar epithelium  
(C) Ciliated epithelium, Cuboidal epithelium (D) Cuboidal epithelium, ciliated epithelium
- Which of the following is a function of cuboidal epithelium :-  
(A) Participate in secretion and excretion (B) Helps to remove mucus from trachea  
(C) To move mucus in a specific direction (D) Protect inner tissue cells
- Name the structure arranged on basement membrane in compound epithelium :-  
(A) Malpighian Corpuscle (B) Malpighian tubule  
(C) Germinative layer (D) Malpighian body
- Which tissue occurs with in the passages of the excretory organs :-  
(A) Ciliated Stratified epithelium (B) Squamous Stratified epithelium  
(C) Transitional epithelium (D) Cuboidal Stratified epithelium
- When the surface cells of stratified epithelium contain insoluble protein (Keratin) the tissue is called :-  
(A) Stratified Squamous Keratinised (B) Stratified Ciliated Keratinised  
(C) Stratified Cuboidal Keratinised (D) Stratified Columnar Keratinised
- Name of a structure formed of collagen protien :-  
(A) Yellow elastic (B) White fibres (C) Yellow fibre (D) White fibrous
- Which cells of areolar tissue are able to move and ingest foreign particles  
(A) Fibroblast (B) Mast cells (C) Histocytes (D) All above

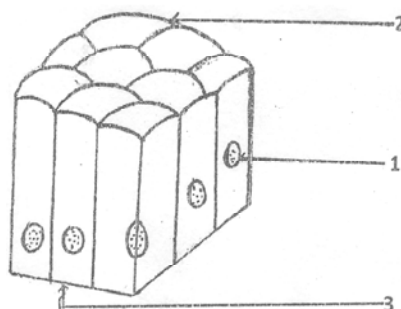
13. Which of the following is not a component of connective tissue proper .  
 (A) Adipose tissue      (B) Tendon      (C) Cartilage      (D) Ligament
14. Which of the following is not a component of Skeletal connective tissue :-  
 (A) Compact bone      (B) White-fibro cartilage  
 (C) Calcified cartilage      (D) Areolar tissue
15. What is Synthesized by fibroblast  
 (A) Collagen      (B) Elastin      (C) (A) and (B)      (D) (A) or (B)
16. Which connective tissue proper is made up of two types of fibre and cells :-  
 (A) Tendon      (B) White fibrous tissue  
 (C) Ligament      (D) Areolar tissue
17. Which of the following tissue is normally found in tendon .  
 (A) Hyaline cartilage      (B) White fibrous tissue  
 (C) Ligament      (D) Areolar tissue
18. It connects the bones joints and holds them in position :-  
 (A) Tendon      (B) White elastic cartilage  
 (C) Ligament      (D) (B) and (C) both
19. Give examples of elastic bond  
 (A) Tendon      (B) Cartilage  
 (C) Ligament      (D) (B) and (C) both
20. Which of the following structure present in abundance in subcutaneous tissue :-  
 (A) Yellow elastic tissue      (B) Adipose tissue  
 (C) White fibrous tissue      (D) Tendon
21. It is composed of bundles of collagen fibers :-  
 (A) Tendon      (B) White-fibro cartilage  
 (C) Hyaline cartilage      (D) White fibrous tissue
22. Who synthesized elastin protein  
 (A) Fibroblasts      (B) Adipose cell      (C) Phagocytic cell      (D) Mast cells
23. Which of the following structure is seen in the joints between skull bones :-  
 (A) Yellow elastic tissue      (B) Cellular Cartilage  
 (C) White Fibrous tissue      (D) Tendon
24. Which Structure is able to move in areolar tissue  
 (A) Adipose cell      (B) Phagocytic cell      (C) Fibroblasts      (D) Mast cell
25. Name the connective tissue present in larynx  
 (A) White fibrous cartilage      (B) Hyaline cartilage  
 (C) Areolar tissue      (D) Yellow elastic cartilage
26. Which connective tissue is found in epiglottis :-  
 (A) Yellow elastic cartilage      (B) Calcified cartilage  
 (C) Areolar tissue      (D) White fibrous tissue

27. A Structure having blood vessels in hyaline cartilage is :-  
 (A) Matrix (B) Perichondrium (C) Lacunae (D) Chondroblasts
28. In which of the following yellow elastic cartilage is observed :-  
 (A) Tip of nose (B) Ear pinna  
 (C) Epiglottis (D) all above
29. Which of the following characteristics observed in yellow elastic cartilage :  
 (A) It has elastin  
 (B) Its matrix is homogeneous and translucent  
 (C) A few flat and elongated fibroblast cells lay between the fibre bundles.  
 (D) Cell are ovoid in shape and are surrounded by matrix.
30. Matrix of bone is composed of protein called  
 (A) Myosin (B) Ossein (C) Elastin (D) Actin
31. In the centre of bone there is a narrow cavity it contains a tissue which :-  
 (A) is composed of adipose (B) is yellow in colour  
 (C) Possess blood vessels (D) all above
32. Which of the following structure is not included in blood cells  
 (A) Fibrinogen (B) Lymphocytes (C) Basophils (D) Erythrocytes
33. Which is metabolic waste product of blood :-  
 (A) Fibrinogen (B) carbon dioxide (C) Lysine (D) Immunoglobulin
34. What is the number of RBCs per cubic milliliter blood of adult made under normal condition .  
 (A) 41,00,000 to 60,00,000 (B)  $7.5 \pm 3.5 \times 10^3$   
 (C)  $39 \text{ to } 55 \times 10^{10}$  (D) 39,00,000 to 55,00,000
35. Which structure of blood is nucleated?  
 (A) Erythrocytes (B) Leucocytes (C) Blood platlets (D) Above all
36. Nucleus of which leucocytes have many lobe :-  
 (A) Eosinophils (B) Neutrophils (C) Basophils (D) Monocytes
37. The darker bands in muscle fibre is called  
 (A) H - bands (B) A - bands (C) Z - bands (D) I - bands
38. Which muscle tissue is mononucleate having granular sarcoplasm around its nucleus :-  
 (A) Smooth muscle (B) Voluntary muscle tissue  
 (C) Cardiac muscle (D) Skeletal muscle tissue
39. The lighter bands in muscles fiber is called :-  
 (A) I - bands (B) H - bands (C) Z - bands (D) A - bands
40. A structure formed by enveloped of schwann's cells  
 (A) Nodes of Ranvier (B) Neurilemma (C) Myelin Sheath (D) (A) and (C) both
41. Cell body of which neuron giving rise to both dendrite and axonal branches.  
 (A) Unipolar neuron (B) Multipolar neuron (C) Bipolar neuron (D) All the above

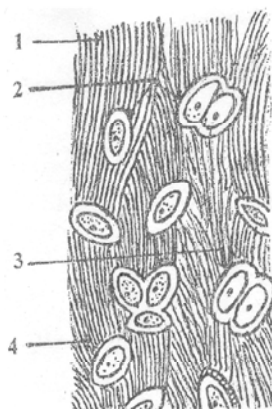
42. Which structure is indicated by each myelinated nerve fibre.  
 (A) Neurilemma (B) Constrictions at regular intervals called nodes of ranvier  
 (C) Neurotransmitters (D) Synapes
- Directions : In the following questions there are two statements; Assertion (A) and Reason (R):  
 (A) Both A and R are true and R is correct explanation of A.  
 (B) Both A and R are true but R is not correct explanation of A.  
 (C) A is true and R is wrong.  
 (D) A is wrong and R is true.
43. A : Squamous epithelium protect the under lying tissue.  
 R : Outer most layer of skin of frog made up of squamous epithelium.  
 (A) (B) (C) (D)
44. A : Thickness of skin layer is maintained.  
 R : In compound epithelium, layer rested on basement membrane shows power of cell division.  
 (A) (B) (C) (D)
45. A : Mast cells are found in areolar tissue.  
 R : Mast cells produces heparin, histamine etc.  
 (A) (B) (C) (D)
46. A : Cartilage bond connects the joints.  
 R : Matrix of cartilage is dense.  
 (A) (B) (C) (D)
47. A : Yellow elastin cartilage has elastin.  
 R : Whie fibrous cartilage has bundles of collagen, fibres  
 (A) (B) (C) (D)
48. A : Blood has properties of clotting  
 R : Blood has plasma protein fibrinogen.  
 (A) (B) (C) (D)
49. A : Muscle fibre of skeletal muscle is multi nucleate.  
 R : In each animals muscle fibres are attached to bones by tendons.  
 (A) (B) (C) (D)
50. A : Thick and thin filaments overlap for some distance within the 'A' band  
 R : Thin Filaments slides over thick filaments  
 (A) (B) (C) (D)
51. Which pair of structures distinguishes a nerve cell from other cells.  
 (A) Vacuole and fibres (B) Nucleus and mitochondria  
 (C) Perikaryon and dendrites (D) Flagellum and medullary sheath
52. Transitional epithelium occurs in : (MHTCET 2008)  
 (A) Blood vessels (B) Trachea  
 (C) Kidney (D) Ureter/urinary bladder

53. The study of tissues is known as : (MPPMT 2010)  
 (A) Physiology (B) Ecology (C) Histology (D) Anatomy
54. Find out the wrong match : (Kerala 2010)  
 (A) Eosinophils Allergic response  
 (B) Basophils Secrete histamine and serotonin  
 (C) Monocytes Secrete heparin  
 (D) Lymphocytes Immune response
55. The outer covering of cartilage is called. (WB 2010)  
 (A) Peritoneum (B) Periosteum (C) Endosteum (D) Perichondrium
56. Skin is : (CPMT 2010)  
 (A) Cuboidal epithelium  
 (B) Stratified epithelium  
 (C) Columnar epithelium  
 (D) Pseudostratified epithelium
57. Match the animals listed in column-I to blood listed in column-II. (KCET 2010)
- | Column-I       | Column-II                                    |
|----------------|--|
| (P) Man        | (i) Plasma and cells are colourless          |
| (Q) Earth worm | (ii) Plasma colourless and nucleated RBC     |
| (R) Cockroach  | (iii) Plasma colourless and enucleated RBC   |
| (S) Frog       | (iv) Plasma red and nucleated colourless RBC |
|                | (v) Plasma and RBCs have haemoglobin         |
- (A) (P-iii), (Q-iv), (R-i), (S-ii) (B) (P-iv), (Q-v), (R-iii), (S-ii)  
 (C) (P-i), (Q-iv), (R-ii), (S-iii) (D) (P-v), (Q-iii), (R-i), (S-iv)
58. Matrix of bone and cartilage can be distinguished by the presence of : (Orrisa 2010)  
 (A) Lacuna (B) Chromatophores (C) Haversian canals (D) Adipose cells
59. Which type of tissue forms glands : (MPPMT 2010)  
 (A) Epithelial (B) Muscular (C) Nervous (D) Connective
60. Which of the following blood cells help in blood coagulation. (Orrisa 2010)  
 (A) RBCs (B) Lymphocytes (C) Thrombocytes (D) Basophils
61. Fibroblasts macrophages and mast cells are present in : (Kerala 2010)  
 (A) Cartilage tissue (B) Areolar tissue  
 (C) Adipose tissue (D) Glandular epithelium
62. Which type of epithelium is involved in a function to move particles or mucus in specific direction : (HPPMT 2010)  
 (A) Squamous epithelium (B) Cuboidal epithelium (C) Columnar epithelium (D) Ciliated epithelium
63. Which of these is not found in connective tissue : (MPPMT 2010)  
 (A) Collagen fibres (B) Basement membrane (C) Hyaluronic acid (D) Fluid

64. Multi-lobed nucleus and granular cytoplasm are characteristics of which of the WBCs : (Orissa 2010)  
 (A) Neutrophils            (B) Monocytes            (C) Lymphocytes            (D) Eosinophils
65. Which one of the following plasma proteins is involved in the coagulation of blood. (CBSE 2011)  
 (A) globulin            (B) Fibrinogen            (C) albumin            (D) Serum amylase
66. Which of the following is not a connecting tissue. (CPMT 2010)  
 (A) Blood            (B) bone            (C) Lymph            (D) Nerve
67. The ciliated columnar epithelial cells in humans are known to occur in. (CBSE 2011)  
 (A) Bile duct and oesophagus  
 (B) Fallopian tubes and urethra  
 (C) Eustachian tube and stomach lining  
 (D) Bronchioles and fallopian tubes
68. Which of the following is correct for (1), (2), (3) labelled in the given diagram ?

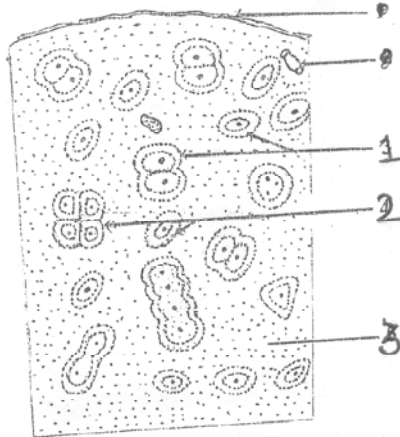


- (A) (1) Nucleus, (2) Basement membrane, (3) Free polygonal surface  
 (B) (1) Free polygonal surface, (2) Basement membrane, (3) Nucleus  
 (C) (1) Nucleus, (2) Free polygonal surface, (3) Basement membrane  
 (D) (1) Basement membrane, (2) Nucleus, (3) Free polygonal surface
69. Which of the following is correct for (1), (2), (3) and (4) in the given diagram ?



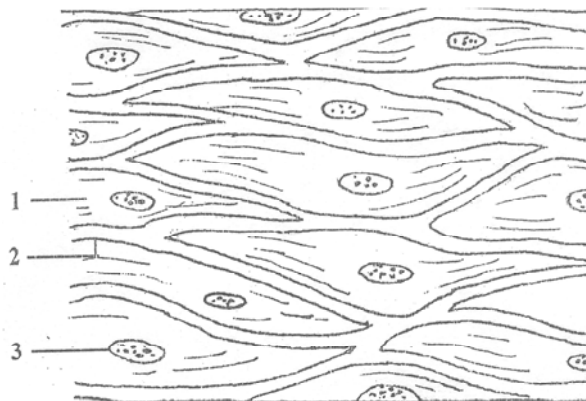
- (A) (1) Matrix (2) Chondrocyte (3) Lacunae (4) Collagen fibre  
 (B) (1) Lacunae (2) Matrix (3) Collagen fibre (4) Chondrocyte  
 (C) (1) Chondrocyte (2) Matrix (3) Collagen fibre (4) Lacunae  
 (D) (1) Collagen fibre (2) Lacunae (3) Chondrocyte (4) Matrix

70. Which of the following is correct for (1), (2) and (3) in the given diagram ?



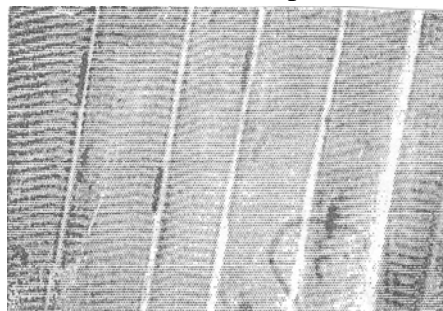
- (A) (1) Lecunae (2) Chondrin Matrix (3) Chondrocytes
- (B) (1) Chondrocytes (2) Lecunae (3) Chondrin Matrix
- (C) (1) Chondrocytes (2) Lecunae (3) Chondrin Matrix
- (D) (1) Chondrin matrix (2) Chondrocytes (3) Lecunae

71. Which of the following is correct for (1), (2), (3) in the given diagram ?



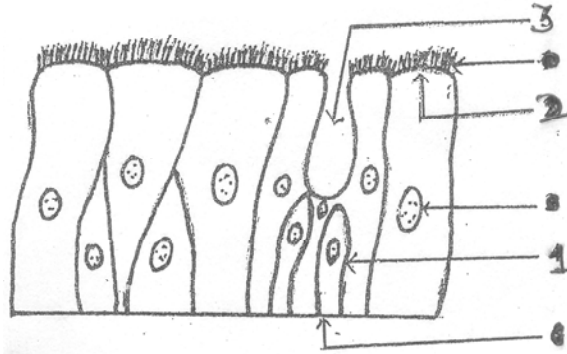
- (A) (1) Sarcoplasm (2) Sarcolemma (3) Nucleus
- (B) (1) Nucleus (2) Sarcoplasma (3) Sarcolemma
- (C) (1) Sarcolemma (2) Nucleus (3) Sacroplasm
- (D) (1) Sarcoplasm (2) Sarcolemma (3) Nucleus

72. In the following diagram the thin filament is made up of.



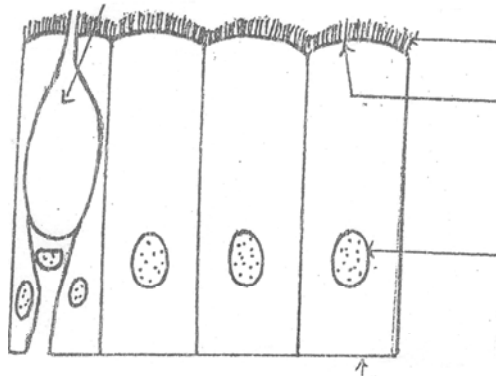
- (A) Only myosin
- (B) Actin, tropomyosin, troponin
- (C) H-line, troponin
- (D) Myosin, actin and tropomyosin

73. Which of the following is correct for (1), (2), (3) in the given diagram ?



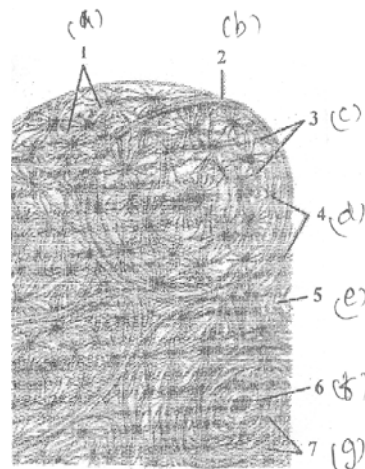
- (A) (1) Basal granule (2) Supporting cells (3) Mucus secreting cells
- (B) (1) Supporting cells (2) Mucus secreting cell (3) Basal granule
- (C) (1) Supporting cells (2) Basal granule (3) Mucus secreting cell
- (D) (1) Mucus secreting cell (2) Supporting cells (3) Basal granule

74. Write location of the following diagram.



- (A) Gall bladder
- (B) Lungs
- (C) Thyroid gland
- (D) Uterine tube

75. In the diagram of the section of bone tissue given below, certain parts have been indicated by alphabets, choose the answer in which these alphabets have been correctly matched with the parts which they indicate.



- (A) A = Interstitial lamellae, B = Laemaellae with osteocytes, C = Blood vessels, D = Nerve, E = Canaliculi, F = Naversian canal, G = Lamellae



(B) A = Interstitial lamellae, B = Haversian system, C = Concentric lamellae, D = Lacuna with bone cells, E = Matrix, F = Haversian canal, G = Canaliculi

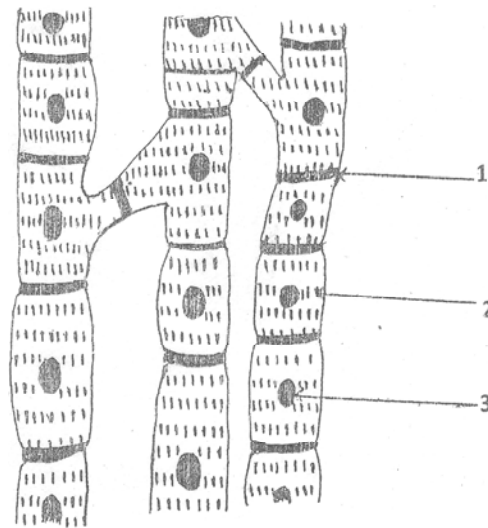
(C) A = Interstitial lamellae, B = Osteocytes, C = Nerve, D = Blood vessels, E = Canaliculi, F = Haversian system, G = Lamellae

(D) A = Interstitial lamellae, B = Osteocytes, C = Nerve, D = Blood vessels, E = Lamellae, F = Haversian canal, G = Canaliculi

76. Which of the following is correct for (1), (2), (3) in the given diagram ?

(A) (1) Nucleus (2) Bands (discs) (3) Intercalated disc

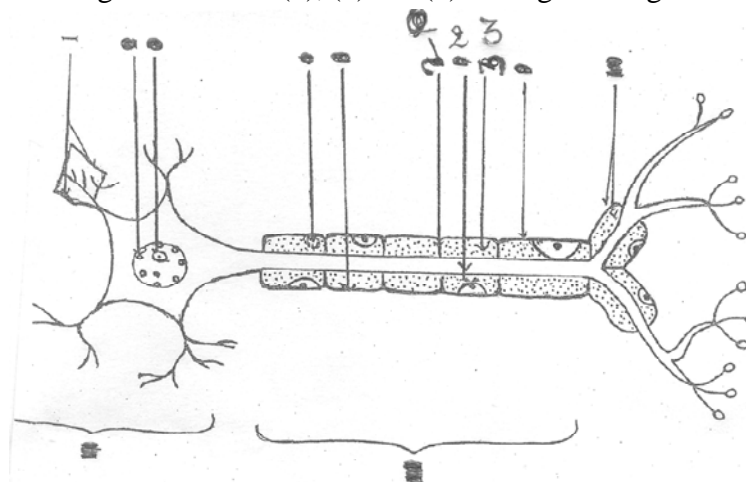
(B) (1) Bands (disc) (2) Nucleus (3) Intercalated disc



(C) (1) Nucleus (2) Intercalated disc (3) Bands (discs)

(D) (1) Intercalated disc (2) Bands (discs) (3) Nucleus

77. Which of the following is correct for (1), (2) and (3) in the given diagram ?



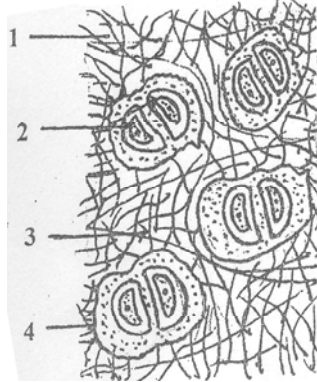
(A) (1) Neuroaxon (2) Myelin sheath (3) Dendron

(B) (1) Myelin sheath (2) Neuroaxon (3) Dendron

(C) (1) Dendron (2) Neuroaxon (3) Myelin sheath

(D) (1) Myelin sheath (2) Dendron (3) Neuroaxon

78. Which of the following is correct for (1), (2) and (3) in the given diagram ?



- (A) (1) Elastic fibre (2) Lacunae (3) Matrix (4) Chondrocytes
- (B) (1) Matrix (2) Chondrocytes (3) Lacunae (4) Elastic fibre
- (C) (1) Chondrocytes (2) Matrix (3) Elastic fibre (4) Lacunae
- (D) (1) Lacunae (2) Elastic fibre (3) Matrix (4) Chondrocytes

79. Which tissue indicated by given diagram ?

- (A) Calcified cartilage (B) Hyaline cartilage
- (C) White fibre cartilage (D) Yellow elastic cartilage

### ANSWER KEY

- |         |         |         |         |
|---------|---------|---------|---------|
| 1. (B)  | 2. (C)  | 3. (C)  | 4. (B)  |
| 5. (A)  | 6. (C)  | 7. (A)  | 8. (C)  |
| 9. (D)  | 10. (A) | 11. (B) | 12. (C) |
| 13. (C) | 14. (D) | 15. (C) | 16. (D) |
| 17. (B) | 18. (C) | 19. (A) | 20. (B) |
| 21. (A) | 22. (A) | 23. (B) | 24. (B) |
| 25. (B) | 26. (A) | 27. (B) | 28. (D) |
| 29. (A) | 30. (B) | 31. (D) | 32. (A) |
| 33. (B) | 34. (A) | 35. (B) | 36. (B) |
| 37. (B) | 38. (A) | 39. (A) | 40. (B) |
| 41. (B) | 42. (B) | 43. (A) | 44. (A) |
| 45. (B) | 46. (D) | 47. (B) | 48. (A) |
| 49. (C) | 50. (B) | 51. (C) | 52. (D) |
| 53. (C) | 54. (C) | 55. (D) | 56. (D) |
| 57. (A) | 58. (C) | 59. (A) | 60. (C) |
| 61. (B) | 62. (D) | 63. (B) | 64. (A) |
| 65. (B) | 66. (D) | 67. (D) | 68. (C) |
| 69. (D) | 70. (C) | 71. (A) | 72. (D) |
| 73. (C) | 74. (D) | 75. (D) | 76. (D) |
| 77. (C) | 78. (A) | 79. (D) |         |

## Unit-II

### Chapter-7 & 8. Morphology of Plants

#### IMPORTANT POINTS

Flowering plants are the most dominant plants of the earth, exhibit some variations in morphology, possess well-developed shoot and root systems, which is positively geotropic and hydrotropic and negatively phototropic, and develops from radical. Dicot plants have tap root system and monocots have fibrous root system. Roots help in fixation of plant in soil, and absorption of water and minerals. They also help in storage of food, mechanical support, climbing, photosynthesis, respiration, absorption of moisture, parasitism, symbiosis and reproduction. On the other hand, shoot system is developed from plumule, negatively geotropic and hydrotropic, and positively phototropic, which is differentiated into stem, leaves, flowers and fruits. Stem possessor node, internode, leaves, hairs, axillary & apical buds. Stem helps in storage of food, reproduction, protection, climbing and photosynthesis. On the basis of types of venations, there are two types of leaves – reticulate and parallel. Leaves are also of two types – simple and compound. On the basis of arrangement, of leaves are of three types – alternate, opposite and whorled. Leaves help in storage of food, support, climbing and protection.

Arrangement of flowers is known as Inflorescence, which is of two types – racemose and cymose. A typical flower consists of four whorls – calyx, corolla, androecium and gynoecium. Arrangement of sepals or petals in flower is called aestivation, which are five types – valvate, twisted, imbricate, quincuncial and vexillary. Of these, androecium is composed of stamens, which may be free or united; Each stamen consists of filament, anther and connective, while gynoecium is made up of carpels, consists of stigma, style and ovary. Arrangement of ovules within ovary is known as placentation, which may be marginal, axile, parietal, basal and central. After fertilization, ovary is converted into fruit and ovules into seeds. There are three types of fruits – simple, aggregate and composite. Fleshy fruits are of three types – drupe, berry and pome. Seeds are either monocotyledonous or dicotyledonous, exospermic or endospermic. Floral features of any plant is exhibited by floral diagram and floral formula.

- Fibrous root in maize develop from:
 

(a) Lower internodes	(b) Lower nodes
(c) Upper nodes	(d) None of the above
- Which of the following plants have root pockets?
 

(a) Eichhorinia	(b) Capparis	(c) Opuntia	(d) Banyan
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- In which of following, the plants have all roots?
 

(a) Podostemon	(b) Lemna	(c) Wolffia	(d) Utricularia
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- Food present in bulbil occurs in:
 

(a) Root	(b) Stem	(c) Leaf base	(d) Petioles
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5. Form which part of root, root hairs develop ?
  - (a) Region of maturation
  - (b) Region of elongation
  - (c) Meristematic region
  - (d) Region of root cap
6. Epiphytic roots are found in :
  - (a) Indian rubber
  - (b) Orchid
  - (c) Tinospora
  - (d) Cuscuta
7. Potatoes are borne on :
  - (a) Primary roots
  - (b) axil of scaly leaves
  - (c) Lateral roots
  - (d) Adventitious roots
8. Some plants have rhizome and roots as underground structures. Which characteristics of rhizome would distinguish them from roots?
  - (a) Rhizomes are thicker than roots.
  - (b) Rhizomes have scaly leaves
  - (c) Rhizomes are thinner than roots
  - (d) None of the above
9. Sweet potato is a modification of:
  - (a) Primary root
  - (b) leaf
  - (c) underground root
  - (d) Adventitious root
10. Roots are differentiated into adventitious roots by their:
  - (a) Function
  - (b) appearance
  - (c) place of origin
  - (d) position
11. Winged petiole is found in;
  - (a) citrus
  - (b) acacia
  - (c) radish
  - (d) peepal
12. In one of the following the stem performs the function of storage and propagation:
  - (a) Ginger
  - (b) Wheat
  - (c) Radish
  - (d) Groundnut
13. Leaves are attached to the stem at :
  - (a) Apical meristem
  - (b) Internode
  - (c) Nodes
  - (d) Axillary meristem
14. Phyllotaxy refers to;
  - (a) Arrangement of leaves on stem
  - (b) Folding leaf in the bud
  - (c) (a) & (b) both
  - (d) None of the above
15. Plants with jointed stem and hollow internodes are known as :
  - (a) Clums
  - (b) Scape
  - (c) Ephemerals
  - (d) Lianas
16. Bulbils take part in :
  - (a) Sexual reproduction
  - (b) Respiration
  - (c) Transpiration
  - (d) Vegetative reproduction
17. Stem is very much reduced in:
  - (a) Tuber
  - (b) Bulb
  - (c) Corm
  - (d) Rhizome
18. Turmeric is a stem and not a root because :
  - (a) It stores food material
  - (b) It grows parallel to soil surface
  - (c) It has nodes and internodes
  - (d) It has chlorophyll
19. A potato tuber is underground stem because:
  - (a) It has swollen and non-green
  - (b) It possesses axillary buds
  - (c) It possesses starch as stored food.
  - (d) It possesses starch as stored food

20. Grasses are examples of the following type of stem:  
 (a) Suckers                      (b) Runners                      (c) Stolon                      (d) Rhizomes.
21. Red root is name of:  
 (a) Carrot                      (b) Sweet potato                      (c) Potato                      (d) Beet root
22. Tiny sacs or bladders are found in:  
 (a) Utriculariya                      (b) salvinia                      (c) nepenthes                      (d) Hydrilla
23. Which would do maximum harm to a tree ? The loss of:  
 (a) Half of its branches  
 (b) All of its leaves  
 (c) Half of its flower  
 (d) Half of its bark
24. Smallest dicotyledonous parasitic plant of the world is: (JIPMER 1997)  
 (a) Coryadalis nana                      (b) Primula minutissima  
 (c) Arcethobium minustissimum                      (d) Marsilea minuta
25. Adventitious roots: (AFMC:1994, Chandigadh CETs 1997)  
 (a) Develop from radical  
 (b) Develop from flower  
 (c) Develop from embryo  
 (d) Develop from any part of plant body except radical
26. The arrangement of leaves on stem is called:  
 (a) Venation                      (b) Vernation                      (c) Phyllotaxy                      (d) Axis
27. Stem modified into flattened photosynthetic structure is:  
 (a) Phyllode                      (b) Bulbil                      (c) Phylloclade                      (d) Tendril
28. Nodulated roots occur in: (R.P.M.T 1995)  
 (a) Leguminoceae                      (b) Solanaceae                      (c) Malvaceae                      (d) Papilionaceae
29. Insectivorous plants catch insects for obtaining:  
 (a) Na - K                      (b) Taste                      (c) Phosphorus                      (d) Nitrogen
30. Petiole is modified into tendril in  
 (a) Passiflora                      (b) Gloriosa                      (c) Pisum                      (d) clematis
31. Thorn is a stem structure because it:  
 (a) Develops from trunk                      (b) Develops from apical bud  
 (c) modification of bank floralbud                      (d) is pointed
32. Vegetative reproduction of Agave occurs through:  
 (a) Rhizome                      (b) Stolon                      (c) Bulbils                      (d) Sucker
33. What is the eye of potato ?  
 (a) Axillary bud                      (b) Accessory bud                      (c) Adventitious bud                      (d) Apical bud
34. If a raceme inflorescence is branched , it is call?  
 (a) Umbel                      (b) spike                      (c) Cymose                      (d) Panicle

35. Zig-zag development of inflorescence axis is an example of:  
 a) Helicoid cyme      b) Scorpioid      c) Umbel      d) Compound umbel
36. Opposite decussate phyllotaxy is found in:  
 a) Calotropis      b) Mango      c) Hibiscus      d) Nerium
37. A brightly coloured bract like covering associated with the banana inflorescence is called:  
 a) Spathe      b) Scape      c) Spiral      d) Scapigeron
38. Inflorescence is :  
 a) Number of flower present on an axis  
 b) Arrangement of flowers on an axis  
 c) Method of the opening of flower  
 d) Type of flower borne on peduncle
39. In monocot male gametophyte is: (C.B.S.E.1990)  
 a) Megaspore      b) Nucleus      c) Microspore      d) Tetrad
40. A catkin of unisexual flower is found in:  
 a) Mulberry      b) Wheat      c) Onion      d) Grass
41. Flower is a :  
 a) Modified cone      b) Modified spike  
 c) Modified branch system      d) Modified reproductive shoot
42. Flowers are always present in :  
 (a) Cryptogamous      (b) Pteridophytes  
 (c) Angiosperms      (d) Bryophytes
43. floral formula represents :  
 (a) number and arrangement of floral parts  
 (b) Number of flowers in an inflorescence  
 (c) Type of flowers in a family  
 (d) None of above
44. From the life cycle point of view the most important part of a plants is:  
 a) Flower      b) Leaf      c) Stem      d) Root
45. The vexillum, (standard) wings and keel in pea flowers constitute:  
 a) Calyx      b) Corolla      c) Androecium      d) Gynaecium
46. Diadelphous condition is present on:  
 a) Citrus      b) Bombyx      c) Pisum      d) Brassica
47. Number of female flowers in a cyathium is:(keralaCET,05 UPCPMT,07 A.P.M.E.E. 1995)  
 a) One      b) Two      c) Three      d) Many
48. Perianth is found in a flower in which :  
 a) Calyx and Corolla are not distinguishable  
 b) Stamens are leaf like  
 c) Corolla leaf- like but calyx is colored  
 d) None of the above

49. Stamens with free anthers but filaments fused into a number of groups are;  
 a) Polyadelphous      b) Diadelphous      c) Monadelphous      d) Syngenesious
50. Pappus is a modification of :  
 a) Calyx      b) Corolla      c) Stamens      d) Gynoecium
51. Placentation in legumes is: (N.C.E.R.T.1988,C.P.M.T. 19977)  
 (a) Basal      (b) Marginal      (c) Axile      (d) Free central
52. The leaves are modified into tendrils, hooks, pitcher ,and bladder in the following plants respectively:  
 a) sweet pea, bignonia, Nepenthes, Utricularia  
 b) sweet pea, bignonia, Utricularia, Nepenthes,  
 c) Nepenthes , bignonia, sweet pea, Utricularia  
 d) Utricularia, Nepenthes, bignonia, sweet pea
53. Leaf apex is modified into tendril in:  
 (a) Smilax      (b) Gloriosa      (c) Australian acacia      (d) Pea
54. A fibrous root system is better adapted than tap root system for:  
 (a) Storage food      (B.H.U. 1993)  
 (b) Anchorage of plant to soil  
 (c) Absorption of water and organic food.  
 (d) Transport of water and organic food.
55. Which is not a stem modification? (A.F.M.C. 1988)  
 a) Rhizome of Ginger  
 b) Corm of Colocasia  
 c) Pitcher of Nepenthes  
 d) tuber of potato
56. A pair of insectivorous plant is: ( C.B.S.E. 1999)  
 a) Dionaea and viscum      b) Nepenthes and bladderwort  
 c) Drosera and rafflesia      d) Venus fly and Rafflesia
57. A phyllode is a modified: (Kerala CET 2004)  
 a) leaf      b) stem      c) root      d) branch
58. An underground specialized shoot with reduced disc like stem covered by fleshy leaves is:  
 (J.K.R.E.T. 2000)  
 a) bulb      b) Rhizome      c) rhizophore      d) bulbil
59. Stipular tendril modification is found in : (Pb. PMT2001)  
 a) Smilax      b) Pea      c) Guava      d) Mimosa pudica
60. Viscum is: (AFMC 2004)  
 a) total stem parasite      b) total root parasite  
 c) partial stem parasite      d) partial root parasite
61. Root pocket does not occur in : (Orrisa 2004)  
 a) Ipomoea      b) Mangrove plants      c) trapa      d) pistia

62. Phylloclades are: (JKCMEE 2004)  
 a) leaf modification  
 b) one internode and long stem  
 c) modified petioles  
 d) green succulent stem of indefinite growth
63. Bladder of Utricularia and Pitchers of nepenthes are modifications of: (JKCMEE 2004)  
 a) leaves  
 b) stems  
 c) root  
 d) flowers
64. Tallest gymnosperm : (AFMC 2006)  
 a) sequoia  
 b) Eucalyptus  
 c) Pinus  
 d) Rannuncoulus
65. The “Eyes” of the potato tuber are : (A.P.M.T.2011)  
 a) Root buds  
 b) Flower buds  
 c) Shoot bud  
 d) Axillary buds
66. Vexillary aestivation is characteristic of the family:  
 a) Asteraceae  
 b) Solanaceae  
 c) Brassicaceae  
 d) Fabaceae
67. Mangrove plant live in:  
 (a) Alpine Tundra  
 (b) Tundra  
 (c) Marshy areas along rivers  
 (d) Marshy areas along sea shore
68. Succulents are likely to be found in:  
 (a) Tropical rain forest  
 (b) Deciduous forest  
 (c) Deserts  
 (d) Tundra
69. In a compound umbel each umbellate is subtended by:  
 (a) Involucre  
 (b) Bracket  
 (c) Involucel  
 (d) Bracteole
70. In the monocotyledonous seeds the endosperm is separated from the embryo by a distinct layer known as: (Kerala 2008)  
 (a) testa  
 (b) epithelial layer  
 (c) tegmen  
 (d) scutellum  
 (e) coleoptile
71. The fleshy receptacle encloses a number of: (C.B.S.E. 2008)  
 (a) Berries  
 (b) achene  
 (c) Unisexual flower  
 (d) Samaras
72. The ovary is half inferior in flowers of : (A.I.P.M.T. 2011)  
 (a) Peach  
 (b) Cucumber  
 (c) Cotton  
 (d) Guava
73. Which one of the following statements is correct? (A.I.P.M.T. 2011)  
 (a) In tomato ,fruit is capsule  
 (b) Seeds of orchids have oil –rich endosperm  
 (c) Placentation in primrose is basal  
 (d) Flower of tulip is a modified shoot.
74. Flowers are zygomorphic in : (A.I.P.M.T. 2011)  
 (a) Mustard  
 (b) Gulmohar  
 (c) Tomato  
 (d) Datura
75. Phyllode is present in : (A.I.P.M.T. 2012)  
 (a) Euphorbia  
 (b) Australian Acacia  
 (c) Opuntia  
 (d) Asparagus
76. Cymose inflorescence is present in: (A.I.P.M.T. 2012)  
 (a) Sesbania  
 (b) Trifolium  
 (c) Brassica  
 (d) Solanum



77. The seed can be defined as:  
 (a) An immature embryo protected by coats  
 (b) A mature ovule with a dormant embryo with enough reserve food and protective coating.  
 (c) A mature spore with enough reserve food and protective coatings  
 (d) A mature ovary with reserve food and protective coverings
78. In the maize grain , the starchy food is stored in:  
 (a) Cotyledons            (b) Coleoptile      (c) Aleurone layer      (d) Endosperm
79. Which one of the following is not fruit?  
 (a) Cabbage            (b) Apple            (c) Watermelon      (d) Tomato
80. What is the edible part of Mango?  
 (a) Epicarp            (b) Mesocarp      (c) Endocarp            (d) Thalamus
80. (b)
81. A fruit in which the fruit wall (pericarp) and seed coat have got fused is called  
 (a) Legume            (b) caryopsis      (c) nut                    (d) drupe
82. A composite or multiple fruit develops from :  
 (a) Polycarpellary ovary                    (b) Bicarpellary and syncarpous ovary  
 (c) Apocarpous ovary                    (d) Inflorescence
83. Wheat grain is an example of :  
 (a) Achene            (b) Caryopsis      (c) Nut                    (d) Follicle
84. Which fruit is a type of nut?  
 (a) Ground nut            (b) Oat            (c) Walnut            (d) Cashew nut
85. What is the edible part in coconut?  
 (a) Entire seed            (b) Fruit wall  
 (c) Endosperm            (d) None of the above
86. Water inside a coconut is : (Manipal PMT 1995)  
 (a) Liquid endosperm            (b) Liquid endocarp  
 (c) Liquid Mesocarp            (d) Liquid Nucleus
87. False fruit is a fruit which develops from:  
 (a) Ovary  
 (b) Any part of the flower except the ovary  
 (c) Apocarpous carpellary  
 (d) Syncarpous carpellary
88. Fibers are found on the seeds of:  
 (a) Calotropis            (b) Gossypium            (c) Alstonia            (d) All of above
89. Which is the correct pair for edible part? (C.B.S.E.2001)  
 (a) Tomato - Thalamus            (b) Maize – Cotyledons  
 (c) Guava - Mesocarp            (d) Date palm- Pericarp

90. How many plants in the list given below have composite fruits that develop from an inflorescence? (A.I.P.M.T. 2012)  
Walnut, poppy, radish, pineapple, apple, tomato, mulberry.  
(a) Five (b) Two (c) Three (d) Four
91. A characteristic of angiosperm is : (AFMC 1992, Hariyana, PMT, 1994)  
(a) Flower (b) Root (c) Seed (d) All of these
92. The capacity for vegetative reproduction is found in:  
(a) Leaves (b) Roots (c) Stem (d) All of above
93. \_\_\_\_\_ are the vegetative organs of the flowering plants:  
(a) Root ,stem, flower (b) Leaves ,stem, fruits  
(c) Roots, leaves, flowers (d) Roots, stem, leaves
94. A root can be differentiated from the stem because of the absence of :  
(a) Green colour (b) Nods and internodes  
(c) Hair (d) Branches
95. Which one of the following is not a characteristic of root:  
(a) Presence of root tap (b) Presence of unicellular hair  
(c) Presence of chlorophyll (d) Absence of buds
96. When the trunk is unbranched and bears crown of leaves at its apex, it is known as :  
(a) Runner (b) Sucker (c) Caudex (d) Culm
97. Parallel venation is a characteristic of :  
(a) Legumes (b) Grasses (c) Parasitic plants (d) Xerophytic plants
98. Leaf morphology helps in :  
(a) Plant identification (b) Plant classification  
(c) None of these (d) (a)&(b) both
99. When the stem or its branch ends into floral bus:  
(a) Vegetative growth starts  
(b) Reproductive growth starts  
(c) Lateral branch is given out  
(d) Apical growth is stimulated
100. Root that grow from any part of the plant body other than the radical are called? (AFMC 2010)  
(a) Tap root (b) Adventitious root  
(c) Modified roots (d) Aerial roots
101. \_\_\_\_require more than two growing seasons to complete their life cycle.  
(a) Annual (b) Perennials (c) Biennials (d) Herbs
102. Modified stem of \_\_\_\_\_ protect the plant from grazing animal.  
(a) Datura festuosa (b) Aloe vera (c) Gloriosa superba (d) Carissa carandus

103. Which of the following is actually not a flower?  
 (a) Shoe flower            (b) Sun flower            (c) Rose            (d) Pea
104. Beauty of Bougainvillea flower are: (AFMC, 1997)  
 (a) Corolla            (b) Calyx            (c) Bracts            (d) Androecium
105. Flower in which only set of one essential organ develops are call: (Kerala,PMT,04)  
 (a) Unisexual            (b) Monoecious            (c) Dioecious            (d) Polygamous
106. Individual components of Perianth are call:  
 (a) Sepals            (b) Petals            (c) Tepals            (d) Brackets
107. Brinjal show \_\_\_\_\_ calyx.  
 (a) Pappus            (b) Deciduous            (c) Caduceus            (d) Persistent
108. The hairs present in maize corn cob are: (AIPMT,2000,2006)  
 (a) Styles            (b) Stigma  
 (c) Seed hairs            (d) Modified hairs of bracts
109. Seed is :  
 (a) Fertilized embryo            (b) Fertilized ovary  
 (c) Fertilized fruit            (d) Fertilized ovule
110. A pome fruit is said to be false because: (CPMT 2000)  
 (a) The pericarp is inconspicuous  
 (b) The endocarp is cartilaginous  
 (c) The fruit is present in fleshy edible thalamus  
 (d) The fruit is derived from inferior ovary
111. Geocarpic fruit is : (AIPMT 2002)  
 (a) Potato            (b) Pea nut            (c) Onion            (d) Garlic
112. Unifoliate leaf is found in: (BHU2002)  
 (a) Pea            (b) Citrus            (c) Royal palm            (d) Oil palm
113. Drupe has : (UGET Manipal, 2004)  
 (a) hard Epicarp            (b) hard endocarp  
 (c) hard mesocarp            (d) no epicarp
114. Zygomorphic condition can be represented as: (UP CPMT,, 2009)  
 (a)  $\oplus$             (b) %            (c) P            (d) G
115. Which of these characters do not belong to Compositae?( CPMT,1991)  
 (a) Ligulate ray flowers            (b) Basal ovules  
 (c) Syngenesious stamens            (d) Five lobed stigma
116. An inflorescence always forms a : (Punjab PMT 1997 )  
 (a) Multiple or composite fruit            (b) Simple fruit  
 (c) Dry dehiscent fruit            (d) Aggregate fruit

117. Which of the following pairs is not correct? (J & k, 2004)
- (a) Corymb - Candytuft (b) Capitulum - sunflower  
 (c) Catkin – Mulberry (d) Raceme – Wheat
118. Find the incorrect match.
- (a) Stilt root - turnip  
 (b) Tap root - carrot  
 (c) Adventitious root - sweet potato  
 (d) Prop root- banyan tree
119. Which of the following is a wrong pairing?
- (a) Raceme - Mustard  
 (b) spike - Achyranthus  
 (c) compound umbel - Onion  
 (d) spadix - musa
120. The correct match for edible part of fruit is: (AIPMT,CBSE 2001)
- (a) Guava – pericarp with thalamus  
 (b) Tomato – thalamus  
 (c) Maize – cotyledon  
 (d) Date palm – epicarp
121. The correct match for Branching
- | Colum I        | Colum II            |
|----------------|---------------------|
| (P) Mirabilis  | I sympodial         |
| (Q) Polyalthea | II dichotomous      |
| (R) Vitis      | III monopodial axis |
| (S) Hyphaene   | IV Cymose           |
- (a) (P)-III, (Q) – IV, (R)-I, (S)-II  
 (b) (P)-I, (Q)- IV, (R)- III, (S)- II  
 (c) (P) - IV ,(Q) - III (R)-I, (S)-II  
 (d) (P)-IV (Q)- III, (R)- II , (S)- I
122. Select the correct pair
- | Colum I                | Colum II          | Colum III    |
|------------------------|-------------------|--------------|
| (a)Unilocular Ovary    | (p) Five Chamber  | I Petuna     |
| (b) Bilocular Ovary    | (q) Three Chamber | II Asparagus |
| (c) Trilocular Ovary   | (r) One Chamber   | III Hibiscus |
| (d) Pentalocular Ovary | (s) Two Chamber   | IV Sunflower |
- A:(a)- (r)- IV, (b)-(s)-III ,(c)- (p)-II, (d)- (q) -I  
 B:(a)- (r)- IV, (b)- (s)-I, (c)- (q)- II, (d)- (p)-III  
 C:(a)- (s) -I, (b)- (r)- II,(c)- (q)- IV, (d)- (p)-III  
 D:(a) -(q)-II, (b)- (r)-I (c)- (s)- III, (d)- (p)-IV

123. Select the correct pair

- |                   |                          |       |      |
|-------------------|--------------------------|-------|------|
| (P) Onion         | (I) tubers               |       |      |
| (Q) pea           | (ii) phylloclade         |       |      |
| (R) Potato        | (iii) tunicated bulb     |       |      |
| (S) muehlenbeckia | (iv) foliaceous stipules |       |      |
|                   | (P)                      | (Q)   | (R)  |
| (A)               | (iii)                    | (iv)  | (ii) |
| (B)               | (iv)                     | (iii) | (I)  |
| (c)               | (iii)                    | (I)   | (iv) |
| (D)               | (iii)                    | (iv)  | (I)  |

124. Match the following with correct combination.

- | Colum I                       | Colum II    |
|-------------------------------|-------------|
| (P) Marginal Placentation     | I Petuna    |
| (Q) Axial Placentation        | II Dianthus |
| (R) Free central Placentation | III Mustard |
| (S) Parietal Placentation     | IV Pea      |
- (a): (P)- II, (Q)- I, (R)-IV, (S)-III                      (b): (P)-III, (Q)-IV, (R)-II, (S)- I
- (c): (P)- IV, (Q)- I, (R)-II, (S)-III                      (d): (P)-IV, (Q)-I, (R)-III, (S)- II

125. Match list I with list II and select the correct answer using the codes given below the lists.

- | List I                 | List II       |
|------------------------|---------------|
| P. Total stem parasite | I Loranthus   |
| Q. Assimilatory root   | II Pothos     |
| R. clinging root       | III Tinospora |
| S. partial parasite    | IV cuscuta    |
- |     |    |     |     |    |
|-----|----|-----|-----|----|
|     | P  | Q   | R   | S  |
| (a) | IV | II  | III | I  |
| (b) | IV | III | II  | I  |
| (c) | II | III | I   | IV |
| (d) | II | IV  | III | I  |

126. Match list I with II types of leaves

- | List I                         | List II        |
|--------------------------------|----------------|
| (p) leaf included with in seed | I scaly leaf   |
| (q) small or papery leaf       | II bract       |
| (r) stamen and Carpel          | III seed leaf  |
| (s) which a flower develops is | IV soprophylls |
- |     |     |    |    |    |
|-----|-----|----|----|----|
|     | P   | Q  | R  | S  |
| (a) | III | I  | IV | II |
| (c) | III | IV | I  | II |
- |     |     |     |    |    |
|-----|-----|-----|----|----|
|     | P   | Q   | R  | S  |
| (b) | I   | III | II | IV |
| (d) | III | II  | I  | IV |

127. Match sign with select the correct answer using the codes given below the lists.

- |              |                      |
|--------------|----------------------|
| I            | II                   |
| P. $C_{(4)}$ | I six free tapals    |
| Q. $K_4$     | II four fused petals |
| R. $P_6$     | III four free sepals |
| R. $A_4$     | IV four free stamens |

- |     |    |     |     |    |
|-----|----|-----|-----|----|
|     | p  | Q   | R   | S  |
| (a) | I  | II  | III | IV |
| (b) | IV | III | II  | I  |
| (c) | II | III | I   | IV |
| (d) | IV | I   | III | I  |

128. Select the wright pair :

- (a) Mustard plant :  $\oplus, \&, K_{2+2}, C_4, A_{2+4}, \underline{G}_{(2)}$
- (b) Legume : Br,  $\oplus \&, K_5, C_{1+2+(2)}, A_{1+(9)}, \underline{G}_1$
- (c) Solanum: Ebr,  $\oplus \&, K_{(5)}, C_{(5)}, A_5, \underline{G}_{(2)}$
- (d) Asphodelus: Br $\oplus \&, P_{3+3}, C_4, A_{3+3}, \underline{G}_{(3)}$

129. Labeling the following diagram:

- (a). p-leaf q. -stem .r. - fruit s- flower
- (b). p- flower q- stem r- leaf s- fruit
- (c). p- leaf q-stem r- flower, s- fruit
- (d). p- flower q- leaf r- stem s- fruit



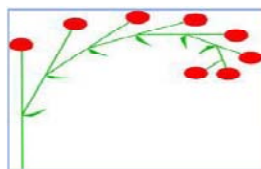
130. Which plant is this and live in \_\_\_\_\_ habitat.

- (a) Opuntia , ever green
- (b) Muehlenbevkia, dry
- (c) Dioscorea , thorn forest
- (d) Agave , desert



131. Identify the inflorescence

- (a) Raceme
- (b) Spike
- (c) Helicoid
- (d) Scorpioid



132. Give the name in following

- (a) P-terminal bud , q-old flower r-floral bud, s-leaf
- (b) P- terminal bud, q- floral bud, r- old flower, s- leaf
- (c) P- old flower, q- terminal bud r- leaf s-floral bud
- (d) P- leaf, q- floral bud, r- old flower, s- terminal bud



133. Name of the following aestivation type:

- (a) Valvate
- (b) Twisted
- (c) Imbricate
- (d) Quincuncial



134. Labeling the given figure :

- (a) P- stigma q- style
- (b) P- anther q- filament
- (c) P anther q- style
- (d) P- stigma q- filament



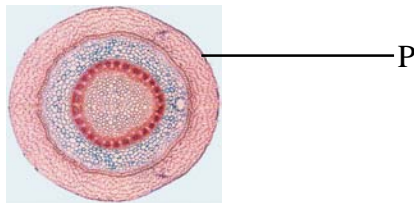
135. Identify this plant modification and Select the correct option

- (a) Sweet potato – simple tuberous root
- (b) Dahlia – fasciculated tuberous root
- (c) Asparagus - simple tuberous root
- (d) Beet – tap root



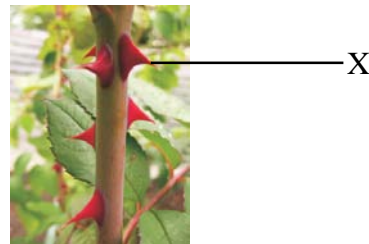
136. Labeling 'p' in root section

- (a) Velamen tissue
- (b) Meristematic tissue
- (c) Growth tissue
- (d) Fleshy tissue



137. Name the labeled 'x' in plant

- (a) Thorn
- (b) Hook
- (c) Prickles
- (d) Stipules



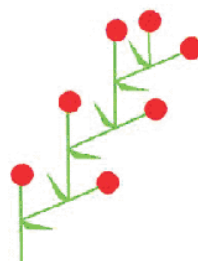
138. Choose correct option according to given leaf:



- (a) Moringa – multipinnate compound leaf
- (b) Balanites- Bifoliate compound leaf
- (c) Caesalpinia - bipinnate compound leaf
- (d) Aegle – multifoliate

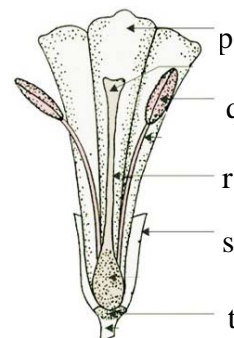
139. Choose the correct option by given diagram :

- (a) Scorpioid - Heliotropium
- (b) Scorpioid - Hamelia
- (c) Spike - Achyranthus
- (d) Spike – musa



140. Name the labeled flower part.

- (a) P-peduncle, q-ovary r-stigma, s-calyx, t-thalamus
- (b) P-corolla, q-anther, r-stigma, s-calyx, t- peduncle
- (c) P-petals, q-style, r-stigma, s-stamen, t- ovary
- (d) P- corolla, q- anther , r-style, s-calyx t- thalamus



141. Choose correct option by giving diagram:

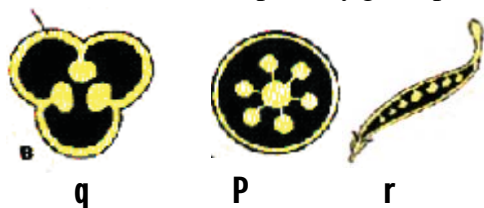
- (a) C- vexillary, D- Quincuncial , E- Imbricate
- (b) C- vexillary , D- Imbricate , E- Quincuncial,
- (c) C-Imbricate , D-Quincuncial, E-vexillary
- (d) C- Imbricate , D- vexillary , E-Quincuncial



142. Choose correct option

- |                       |              |
|-----------------------|--------------|
| Colum 1               | Colum 2      |
| (p) polydelphous      | I china rose |
| (q) monodelphous      | II pea       |
| (r) diadelphous       | III citrus   |
| (a) P- III, q-I, r-II |              |
| (b) P- III q-II, r- I |              |
| (c) P-I, q- III ,r-II |              |
| (d) P-II, q- III ,r-I |              |

143. Choose the correct option by given placentation

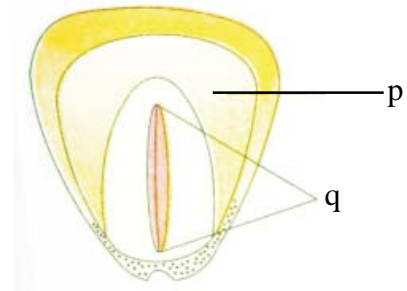


- (a) P-free central-Dianthus, q- parietal-Tomato, r-Marginal -Bean
- (b) P- parietal-Tomato, q- Marginal -sunflower ,r- free central- Bean
- (c) P-parietal-Argemone, q- free central- Bean, r- Marginal -sunflower
- (d) P-free central-Dianthus, q- parietal-Argemone, r-Marginal –Bean



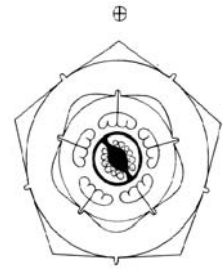
144. Name the labeling part of given diagram:

- (a) P – Endosperm q- embryo
- (b) P- seed coat q- coleoptile
- (c) P- Endosperm q- cotyledon
- (d) P- seed coat q –embryo



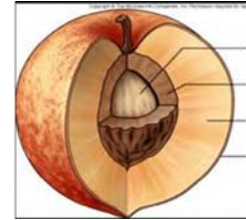
145. Name in given floral diagram:

- (a) P-Calyx, q-Corolla, r-Androecium, s- Gynoecium, t- Mother axis
- (b) P-Calyx, q-Androecium, r- Gynoecium, s-Corolla, t-Mother axis
- (c) P- Corolla, q- Calyx, r-Androecium, s- Gynoecium, t- Mother axis
- (d) P- Corolla, q- Calyx ,r- Gynoecium , s Androecium -t- mother axis



146. Name the following part of seed:

- (a). p-seed, q-endocarp, r-mesocarp, s-exocarp
- (b). p-endocarp, q- seed, r- exocarp , s-mesocarp
- (c). p- seed, q-endocarp, r-mesocarp, s- exocarp
- (d). p-endocarp, q- seed, r- exocarp , s-mesocartp



**S- R Type MCQ's**

**S= Statement**

**R= Reason**

**(A) S and R both are true, where R is definition of S**

**(B) S and R both are true, where R is not reason of S**

**(C) S is true, R is false**

**(D) S is false , R is true**

147. S: leaf to prepare food by carrying out photosynthesis

R: Leaf to arrange gaseous exchange for respiration

- (A) (B) (C) (D)

148. S: The loranthus plant possess nodules on their root system

R: Rhizobium bacteria live in root nodules

- (A) (B) (C) (D)

149. S: In perigynous flower , the thalamus becomes flat, disc like

R: The flower whorls are arranged on the rim of the thalamus

- (A) (B) (C) (D)

150. S: In caryopsis the pericarp and seed coat are fused and form a 'hull'

R: Tridex and vernonia are example of caryopsis

- (A) (B) (C) (D)

151. S: Gloriosa superba is a scientific name of vachhnag

R: vachhange having reticulate venation

- (A) (B) (C) (D)

**ANSWER KEY**

1. (B)		26.(C)		51.(B)		76.(D)		101.(B)		126 .(A)
2.(A)		27.(C)		52. (A)		77.(B)		102.(D)		127. (C)
3(A)		28.(A)		53.(B)		78. (D)		103(B)		128.(D)
4(C)		29(D)		54(B)		79.(A)		104.(C)		129.(C)
5(B)		30.(D)		55(C)		81.(B)		105.(A)		130 . (B)
6(B)		31.(B)		56(B)		82..(D)		106.(C)		313. (C)
7. (B)		32.(C)		57.(A)		83. .(B)		107.(D)		132.(A)
8.(B)		33.(A)		58. (A)		84.(D)		108. (A)		133.(D)
9.(D)		34. (D)		59. (A)		85. (C)		109.(D)		134.(B)
10.(C )		35.(A)		60.(C)		86.(A)		110.(C)		135.(B)
11.(A)		36. (A)		61.(D)		87.(B)		111.(B)		136.(A)
12.(A)		37.(A)		62.(D)		88.(D)		112.(B)		137.(C)
13.(C)		38.(B)		63.(A)		89.(B)		113. (B)		138.(C)
14.(A)		39.(C)		64. (A)		90.(C)		114.(B)		139.(A)
15.(A)		40. (A)		65.(D)		91(A)		115.(D)		140.(D)
16 .(D)		41(D)		66(D)		92.(D)		116.(A)		141.(C)
17. (B)		42.(C)		67. (D)		93.(D)		117. (D)		142.(A)
18.(C)		43.(A)		68.(C)		94.(B)		118.(A)		143.(D)
19.(B)		44.(A)		69.(B)		95.(C)		119.(C)		144(A)
20.(B)		45.(B)		70.(B)		96(C)		120. (A)		145.(B)
21.(D)		46(C)		71.(C)		97.(B)		121(C)		146(C)
22.(A)		47.(A)		72.(A)		98.(D)		122. (B)		147.(B)
23.(B)		48.(A)		73.(D)		99.(B)		123. (D)		148.(D)
24(C)		49.(A)		74.(B)		100.(B)		124. (C)		149.(A)
25(D)		50.(A)		75. (B)				125 .(B)		150.(C)
										151.(B)

•••

## Unit -II

### Chapter 9. Cockroach Comparative Study

#### IMPORTANT POINTS

Cockroach show characteristic features in segmentation, symmentry and body organization. Its scientific name is *Periplaneta americana*.

**Morphology** - Body is covered with hard chitinous exoskeleton. Size about 25 to 45 mm long cm and 8 to 12 broad found all over the world colour varies. Body is divisible into three regions. Head, thorax, abdomen. Each having segmented appedages to perform various functions.

**Anatomy** : (Internal structure) Body wall cockroach has three layers. Digestive system complete - hepatic caecae and malpighian tubules present figure blood vascular system. Open type - Heart has 13 units with valved ostia. Haemocoel has two types of cells. Respiratory system is made up of network of branched tracheal tubes through out the body. Terminal branches are called tracheols. Ten pairs of spiracles formed and protected by chitinous bristles. Excretory system has malpighian tubules is haemolymph. Urecotelic animal. Nervous system is made up of paired ganglia, nerve cords and nerves. Nerve-ring is present sense organs are antennae, eyes, maxillary palps, tarsus of walking legs and anal cirrus. Reproductive system unisexual male slightly bigger. Internal fertilization 14-16 eggs are fertilized in Ootheca vlymphal stage, youngones look alike parents develop into adult by under going ecdyts severl times.

- Generally Cockroach is ..... or ..... colored insect, however in tropical regions, they havebeen reported to be ....., ..... and ..... colored.
 

(A) Brown or red, Yellow, Green and White	(B) Brown or Black, Yellow, Red and Green
(C) Brown or Yellow, Red, Green and White	(D) Red or Yellow, Brown, Green and Black
- In case of common species of Cockroach, Morphologically which statement is correct ?
  - The size of female is slightly bigger than male.
  - In both male and female, numbers of abdominal segments are different.
  - The size of male and female are equal.
  - The size of male is slightly bigger than female.
- Exoskeleton of periplaneta is protected due to ..... .
 

(A) Calcium carbonate	(B) Cutin	(C) Chitin	(D) Mucous
-----------------------	-----------	------------	------------
- Head of the Cockroach is formed by the fusion of ..... segments.
 

(A) Six	(B) four	(C) two	(D) eight
---------	----------	---------	-----------
- Why head of the Cockroach can move easily in all the directions ?
  - In Cockroach head and thorax fuse to form Cephalothorax.
  - Anatomy of mouthpart, are so arranged that head can move easily in all the directions.
  - Head is attached to thorax through a flexible neck.
  - Abdomen of Cockroach is made of three segments.

6. On the head region of Cockroach ..... pairs of ..... and ..... shaped eyes occur.
  - (A) One pair, sessile compound and kidney shaped
  - (B) Two pairs, stalked compound and round shaped
  - (C) Many pairs, sessile simple and kidney shaped
  - (D) Many pairs, stalked compound and kidney shaped
7. Mouthparts of periplaneta are consist of .....different types of articulations.
  - (A) four            (B) eight            (C) six            (D) three
8. On the lateral side of alimentary canal of cockroach ..... glands are found.
  - (A) Acid secreting (B) Salivary            (C) Degestive            (D) Reproductive
9. Each walking leg of periplaneta is made up of .....segments.
  - (A) five            (B) four            (C) six            (D) nine
10. A segment attached to the ventral side of the thorax nearer to the body of Cockroach is ..... .
  - (A) Trochanter    (B) Femur            (C) Coxa            (D) Tarsus
11. Walking legs of periplaneta are attached to ..... and divided into ..... segments.
  - (A) Dorsal tergum, Five            (B) Ventral sternum, Five
  - (C) Dorsal tergum, six            (D) Ventral sternum, Six
12. Third segment of walking leg of Cockroach is..... .
  - (A) Coxa            (B) Trochanter    (C) Femur            (D) Tibia
13. Fiftse segment of walking leg of Cockroach is ..... .
  - (A) Coxa            (B) Tarsus            (C) Femur            (D) Tibia
14. What is the name of second segment of walking leg of Cockroach ?
  - (A) Coxa            b) Femur            (C) Tarsus            (D) Trochanter
15. Each abdominal segment of Ccokroach are covered with ..... outer layers ..... plearae.
  - (A) One, Two    (B) Two, Two    (C) Two, One    (D) One, One
16. Howmany segment are present in an abdomen of the Cockroach ?
  - (A) Eight            (B) Ten            (C) Seven            (D) Nine
17. In Cockroach which tergum possesses a median groove ?
  - (A) Tenth            (B) First            (C) Ninenth            (D) Third
18. Which is the peculiarity of ninenth sternum of maleCockroach ?
  - (A) Anus occurs under it
  - (B) A piar of anal cerci is associated with it
  - (C) Seventh and Eighth sternum are covered with it
  - (D) Male genital openings occurs there
19. Which number of sternum is boatshaped in the Cockroach ?
  - (A) Fifth            (B) Sixth            (C) Seventh            (D) Tenth
20. In Cockroach which segment has female genital opening ?
  - (A) Seventh            (B) Ninth            (C) Tenth            (D) Eighth

21. Which segment has male genital opening in Cockroach ?  
 (A) Ninth (B) Tenth (C) Seventh (D) Eighth
22. Which structure is sound receptor in Cockroach ?  
 (A) Tarsus (B) Anal cerci (C) Compound eye (D) Walking leg
23. Which segments joint to form a genital pouch in female Cockroach ?  
 (A) Seventh and Eighth (B) Ninth and Tenth (C) Eighth and Ninth (D) Sixth and Seventh
24. The distal segment of walking leg of a Cockroach is ..... ?  
 (A) Trochanter (B) Coxa (C) Tibia (D) Tarsus
25. In which succession the three main layers of the body wall of a Cockroach from outer to Inner side are arranged ?  
 (A) Epidermis, Cuticle and basement membrane  
 (B) Cuticle, Epidermis and basement membrane  
 (C) Basement membrane, Cuticle and Epidermis  
 (D) Epidermis, Basement membrane and Cuticle
26. The Epidermis of body wall of the Cockroach is made up of..... ?  
 (A) Squamous epithelium (B) Ciliated epithelium  
 (C) Columnar epithelium (D) Cuboidal epithelium
27. In Cockroach how many structures named after malpighian are present ?  
 (A) One (B) Two (C) Three (D) Four
28. In Cockroach the cavities of foregut and hindgut are lined with ..... .  
 (A) Salivary glands (B) Gizzard (C) Cuticle (D) Chitinous teeth
29. In the alimentary canal of Cockroach the shape of region following the mouth is ..... .  
 (A) Folded (B) Swollen bag like (C) Narrow tubular (D) Thin fibrillar
30. How many secreting lobes are present in each salivary gland of Cockroach ?  
 (A) Two (B) Two pairs (C) Three (D) Six
31. In Cockroach ..... on salivary glands and ..... reservoirs are present ?  
 (A) Two, One (B) One, Two (C) Two, Four (D) Three, Two
32. Crop of the Cockroach occurs at ..... in alimentary canal.  
 (A) Posterior end of oesophagus (B) Near midgut  
 (C) Posterior end of pharynx (D) At the junction of midgut and hindgut.
33. In which of the following regions crop of the Cockroach is located ?  
 (A) Thorax (B) Abdomen  
 (C) Thorax and abdomen (D) Through out the gut
34. In Cockroach, gizzard is ..... organ and ..... occur inside it.  
 (A) Glandular, six dentin teeth (B) Muscular, six chitinous teeth  
 (C) Muscular, four chitinous teeth (D) Glandular, six chitinous teeth
35. Where are sieve like structures present in the alimentary canal of Cockroach ?  
 (A) Anterior end of gizzard (B) In hepatic caecae  
 (C) Posterior end of crop (D) Posterior end of gizzard

36. Where are eight blind hepatic caeca present in Cockroach ?  
 (A) With crop (B) At the junction of midgut and hindgut  
 (C) at the midgut (D) at the foregut.
37. Malpighian tubules in Cockroach are..... organs.  
 (A) Digestive (B) Secretory (C) Excretory (D) Respiratory
38. In Cockroach malpighian tubules open in ..... .  
 (A) At the junction of midgut and hindgut. (B) At the end of hindgut.  
 (C) Near rectum (D) At the posterior end of gizzard.
39. In Cockroach, morphologically rectum is..... shaped and ..... from inside.  
 (A) Tubular, bag like (B) Bag like, folded (C) Folded, baglike (D) Villi, baglike
40. In Cockroach, colon is presnet at the posterior region of ..... .  
 (A) Foregut (B) Hindgut (C) Hepatic caecae (D) Gizzard
41. Cockroach is ..... animal.  
 (A) Herbivorous (B) Insectivorous (C) Omnivorous (D) Carnivorous
42. Cockroach searches its food with the help of..... .  
 (A) Walking legs (B) Mandibles (C) Eye (D) Antennae
43. In alimentary canal of Cockroach ..... cells of midgut and hepatic caeca secrete enzymes.  
 (A) Columnar (B) Cuboidal (C) Ciliated (D) Striated
44. The haemolymph of Cockroach is mostly composed of ..... and ..... .  
 (A) Haemoglobin and blood cells. (B) Plasma and uncertain shaped cells.  
 (C) Haemocynin and plasma. (D) Plasma and certain shaped cells.
45. The heart of Cockroach is made up of ..... units.  
 (A) Thirteen (B) Ten (C) Twelve (D) Four
46. Name the small cells of haemolymph of Cockroach ?  
 (A) Phagocytes (B) Proleucocytes (C) Enocytes (D) Excretory
47. Blood from sinuses enters in the heart of Cockroch through ..... .  
 (A) Artery (B) Vein (C) Arteriole (D) Ostia
48. .... numbers of Ostia are present at the posterior end of heart of Cockroach ?  
 (A) One (B) Two (C) Three (D) Ten
49. Which is the path of blood circulation in Cockroach ?  
 (A) Heart - artery - organs - heart (B) Heart - sinuses - heart  
 (C) Sinuses - artery - organs - vein - heart (D) Heart - artery - heart
50. Total howmany spiracles occur in Cockroach ?  
 (A) Ten (B) Twenty (C) Thirteen (D) Twenty six
51. In Cockroach how many spiracles are present in thoracic region and howmany spiracles are present in abdominal region ?  
 (A) Two pairs and eight pairs (B) Two and eight  
 (C) Eight pairs and two pairs (D) Eight and two

52. The walls of spiracles are framed from .....  
 (A) Blood vessels      (B) Tissue fluid      (C) Chitinous Bristles      (D) Ostia
53. In respiratory system of Cockroach ..... function as filters.  
 (A) Spiracles      (B) Chitinous bristles      (C) Ostia      (D) Tracheoles
54. Main excretory units in Cockroach are .....  
 (A) A pair of kidney      (B) Haemolymph      (C) Chitinous bristles      (D) Malpighian tubules
55. Write location and numbers of malpighian tubules in periplaneta.  
 (A) At the junction of midgut and hindgut, about 150.  
 (B) At the junction of foregut and midgut, about 150.  
 (C) Surrounding gizzard, eight.  
 (D) At the junction of colon and rectum, eight.
56. In Cockroach colour of malpighian tubules is ..... and their ..... end is blind.  
 (A) Green, anterior      (B) Green, posterior  
 (C) Yellow, anterior      (D) Yellow, free (distal)
57. In Cockroach wall of each malpighian tubule is lined by .....and .....cells.  
 (A) Secretory and non-ciliated surface      (B) Glandular and ciliated  
 (C) Squamous and smooth surfaced      (D) Striated and ciliated
58. Which of the following is the function of malpighian tubules of Cockroach ?  
 (A) Absorption of waste from haemolymph and convert them into uric acid.  
 (B) Removes CO<sub>2</sub>  
 (C) Store solid excretory material  
 (D) Reabsorption of water from the hindgut.
59. In Cockroach by which process malpighian tubules absorb waste from the haemocoel ?  
 (A) Osmosis      (B) Endosmosis      (C) Diffusion      (D) Exosmosis
60. In Cockroach waste products collected in malpighian tubules will first enter in .....  
 (A) Gizzard      (B) Hepatic caeca      (C) Haemocoel      (D) Hindgut
61. With reference to excretion, Cockroach is ..... animal.  
 (A) Ammonotelic      (B) Uricotelic  
 (C) Ureotelic      (D) Ammonia and uricotelic
62. Out of following which ganglia unite to form nerving in nervous system of Cockroach ?  
 (A) Suboesophageal, supraoesophageal and circum oesophageal commissures unite to form nerving.  
 (B) Three ganglia in thorax region and six ganglia of abdominal region unite to form nerving.  
 (C) Three pairs of ganglia in thorax region and six pairs in abdominal regions.  
 (D) Three pairs supraoesophageal and one pair suboesophageal ganglia unite to form nerving.
63. In Cockroach ..... ganglia innervate the mouth parts.  
 (A) Supraoesophageal      (B) Suboesophageal  
 (C) Circumoesophageal      (D) Three ganglia of thorax region

64. How many ganglia are present in abdominal region of Cockroach ?  
 (A) 3 pairs                      (B) 6 pairs                      (C) 4 pairs                      (D) 8 pairs
65. Which of the following is a group of senseorgans in Cockroach ?  
 (A) Antennae, eyes, maxillary palps, anal cerci  
 (B) Antennae, compound eye, maxillary palps  
 (C) Antennae, ommatidia, maxillary palps, sternum  
 (D) Antennae, eyes, maxillary palps, tarsus of walking legs and cerci.
66. Which is the correct word for vision of Cockroach ?  
 (A) Three dimensional    (B) Two dimensional  
 (C) Mosaic    (D) Cockroach donot have vision
67. .... is the accessory reproductive gland with testis in male Cockroach.  
 (A) Chitinous gonapophysis    (B) Ejaculatory duct  
 (C) Vas deferens    (D) Mushroom shaped gland
68. In male Cockroach the sperms stored in seminal vesicles form .....  
 (A) Spermatophores                      (B) Zygote                      (C) Testis                      (D) Ejaculatory duct
69. In male Cockroach testes are present in ..... segments of abdomen while mushroom glands occurs in ..... segments.  
 (A) 4 to 6, 5 to 6    (B) 4 to 6, 6 to 7  
 (C) 5 to 6, 4 to 6    (D) 6 to 7, 4 to 6
70. Sperms from the spermatophores in male Cockroach are discharged during .....  
 (A) Fertilization                      (B) Meiotic division                      (C) Copulation                      (D) Spermatogenesis
71. In each ovary of female Cockroach the most developed ova are placed at .....  
 (A) Anywhere in ovarian tubules    (B) At the origin of ovarian tubules  
 (C) In the inner layer of ovary    (D) At the distal free end of ovarian tubule
72. During copulation, in female Cockroach ovum comes in the ..... which is present in ..... cockroach.  
 (A) Ejaculatory duct is male    (B) Ovarian tubule is female  
 (C) Genital chamber in female    (D) Genital chamber is male
73. Fertilization occurs in Cockroach in .....  
 (A) Ovary    (B) Ovarian tubule                      (C) Genital chamber                      (D) Ootheca
74. Cockroach is a ..... animal and development is .....  
 (A) Viviparous, direct    (B) Oviparous, direct  
 (C) Oviparous, indirect    (D) Ovoviviparous, direct
75. Ootheca of Cockroach has ..... eggs which are .....  
 (A) 14 to 16, fertilized    (B) 12 to 14, fertilized  
 (C) 14 to 16 unfertilized    (D) 12 to 14 unfertilized
76. The nymph of Cockroach grows into an adult Cockroach by moulting ..... times.  
 (A) 10 to 12    (B) 6 to 7    (C) 8 to 10                      (D) 14 to 16



77. Howmany abdominal segments are present in male and female Cockroach ? (Kerala PMT 2008)  
 (A) 10, 10                      (B) 9, 10                      (C) 8, 10                      (D) 9, 9
78. Excretory matter of Cockroach is mainly ..... .                      (UP, PMT 2009)  
 (A) Uric acid                      (B) Urea                      (C) Ammonia                      (D) Amino acid
79. Which animal secrete uric acid ?                      (AIPMT 2009)  
 (A) Frog                      (B) Man                      (C) Earthworm                      (D) Cockroach
80. Which statement is true for Cockroach ?                      (NCERT)  
 (A) Ten ovarioles in ovary                      (B) Nymph is caterpillar form  
 (C) Anal cerci are absent in female animal                      (D) It is ureotelic animal
81. Which is the correct option is case of Cockroach in following column A and B ?
- | A                               | B                               |
|---------------------------------|---------------------------------|
| (P) Mouth parts of Cockroach    | (i) Anal cerci                  |
| (Q) Segments of walking leg     | (ii) Malpighian tubule          |
| (R) Sound receptor structure    | (iii) Mandibles, maxillae       |
| (S) Excretory unit              | (iv) Coxa, trochanter           |
| (A) P, Q, R, S = i, ii, iii, iv | (B) P, Q, R, S = iii, iv, ii, i |
| (C) P, Q, R, S = iii, iv, i, ii | (D) P, Q, R, S = iv, iii, i, ii |
82. Select the correct option from following columns is case of Cockroach ?
- |                                  |                                 |
|----------------------------------|---------------------------------|
| (p) Gizzard                      | (i) Sound receptor              |
| (q) Rectum                       | (ii) Chitin                     |
| (r) Anal cerci                   | (iii) Cuticle                   |
| (s) Foregut and midgut           | (iv) 10th tergum                |
| (A) p, q, r, s, = i, iii, ii, iv | (B) p, q, r, s = ii, iv, i, iii |
| (C) p, q, r, s = i, iv, iii, ii  | (D) p, q, r, s = i, ii, iii, iv |
- \* Answer following questions by selecting correct S and R from given options.  
 S - Statement, R - Reason  
 Option for Question number 83 to 90
- (A) S - correct, R - Incorrect, R is explanation of S.  
 (B) Both S and R correct but R is not a explanation of S.  
 (C) S - correct, R - incorrect  
 (D) S-incorrect, R - correct
83. S : Ootheca is formed in female Cockroach by the group of fertile eggs.  
 R : Nymph of Cockroach grows with adult by undergoing moulting process several times.
84. S : Each eye of Cockroach consist of 2000 ommatidia.  
 R : Vision of Cockroach is known as mosaic vision.
85. S : In Cockroach nine pairs of spiracles occur.  
 R : Walls of spiracles are framed from chitinous bristles.

86. S : Head of the Cockroach is attached to the thorax through a flexible neck.

R : Head of the Cockroach cannot move easily in all the directions.

87. S : Cockroach is nocturnal and omnivorous.

R : Species of Cockroach are found all over the world.

88. S : Heart of Cockroach is made up of thirteen units.

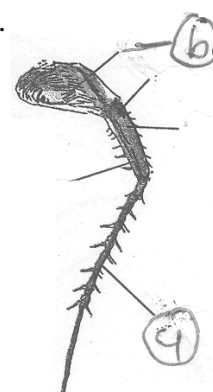
R : Blood vascular system of Cockroach is an open type.

89. S : In cockroach gizzard has hard chitinous teeth.

R : Mouth of Cockroach cannot cut down the food into small pieces.

90. In following diagram label a and b parts successively.

(A) Coxa, tarsus (B) Trochanter, coxa. (C) Tarsus, coxa. (D) tibia, coxa.



### ANSWER KEY

- |         |         |         |         |
|---------|---------|---------|---------|
| 1. (B)  | 2. (D)  | 3. (C)  | 4. (A)  |
| 5. (C)  | 6. (A)  | 7. (C)  | 8. (B)  |
| 9. (A)  | 10. (C) | 11. (B) | 12. (C) |
| 13. (B) | 14. (D) | 15. (C) | 16. (B) |
| 17. (A) | 18. (B) | 19. (C) | 20. (D) |
| 21. (A) | 22. (B) | 23. (C) | 24. (D) |
| 25. (B) | 26. (C) | 27. (B) | 28. (C) |
| 29. (C) | 30. (A) | 31. (C) | 32. (A) |
| 33. (C) | 34. (B) | 35. (D) | 36. (C) |
| 37. (C) | 38. (A) | 39. (B) | 40. (B) |
| 41. (C) | 42. (D) | 43. (A) | 44. (B) |
| 45. (A) | 46. (B) | 47. (D) | 48. (B) |
| 49. (B) | 50. (B) | 51. (A) | 52. (C) |
| 53. (B) | 54. (D) | 55. (A) | 56. (D) |
| 57. (B) | 58. (A) | 59. (C) | 60. (D) |
| 61. (B) | 62. (A) | 63. (B) | 64. (B) |
| 65. (D) | 66. (C) | 67. (D) | 68. (A) |
| 69. (B) | 70. (C) | 71. (D) | 72. (C) |
| 73. (C) | 74. (C) | 75. (A) | 76. (B) |
| 77. (A) | 78. (A) | 79. (D) | 80. (C) |
| 81. (C) | 82. (B) | 83. (B) | 84. (A) |
| 85. (D) | 86. (C) | 87. (B) | 88. (B) |
| 89. (B) | 90. (C) |         |         |



## Unit-III

### Chapter-10 Cell structure

#### IMPORTANT POINTS

All living organisms are made up of cells. A cell is a structural and functional unit of an organism. Some organisms are unicellular while others are multicellular. Each cell has the potentiality to produce a new individual. This is called totipotency of a cell.

On the basis of the presence or absence of a membrane-bound nucleus, organisms are classified into prokaryotes and eukaryotes. Eukaryotes include plants and animals; hence, eukaryotic cells are further classified into plant cells and animal cells.

Major differences between plant cells and animal cells are the presence of a cell wall, plastids, and vacuoles in plant cells. A typical eukaryotic cell consists of a cell membrane, cytoplasm, and nucleus. The cell membrane, also called the plasma membrane, is the outermost layer of an animal cell and is located inner to the cell wall in a plant cell.

A eukaryotic cell possesses membrane-bound organelles like the endoplasmic reticulum, Golgi apparatus, lysosomes, and vacuoles.

The endoplasmic reticulum is made up of cisternae. The endoplasmic reticulum having ribosomes on its outer surface is called rough endoplasmic reticulum. It is associated with the synthesis of proteins.

The endoplasmic reticulum without ribosomes is known as smooth endoplasmic reticulum. It takes part in the synthesis of lipids. The Golgi apparatus is made up of flattened sac-like structures.

Lysosomes are surrounded by a single layer wall. They contain enzymes which digest all macromolecules. In a plant cell, large vacuoles are present which possess a membrane called tonoplast.

As mitochondria are associated with the generation of ATP, they are called the power house of the cell.

The chloroplast is a double-layered structure and possesses grana and stroma.

70S type ribosomes are present in prokaryotic cells while 80S type of ribosomes are present in eukaryotic cells. The shape of the cytoplasm and the shape of the cell is maintained by the cytoskeleton which is made up of microfilaments, microtubules, and intermediate filaments.

A eukaryotic cell possesses a nucleus, nuclear membrane, nucleolus, and chromatin. Depending on the position of centromeres, chromosomes are of four types, like Metacentric, sub-metacentric, Acrocentric, and Telocentric.

1. It is responsible for the beginning of the life of organisms.

- (A) Tissue                      (B) Zygote                      (C) Cell                      (D) Embryonic layer

2. Who proposed the cell theory.

- (A) Singer and Nicholson                      (B) Schwann and Schleiden  
(C) Hooke and Brown                      (D) Robertson

3. Who proposed that new cells arise through cell division of pre-existing cells.

- (A) Robert Hooke                      (B) Rudolf Virchow  
(C) Robert Brown                      (D) Singer

4. It is the Smallest Cell.  
 (A) Bacteria                      (B) Mycoplasm                      (C) Yeast                      (D) Blue green algae
5. Prokaryotic cells have which architectural regions?  
 (A) Cell                      (B) Appendages                      (C) Nucleus                      (D) a-b-c,all
6. The association of more than one ribosome with a single molecule of m-RNA complex is called as...  
 (A) Polypeptide                      (B) Polysome                      (C) Polymer                      (D) Poly Saccharide
7. Which structure possess flagellin protein?  
 (A) Muscles fiber                      (B) Flagellum                      (C) Pilli                      (D) a,b,c-all
8. The cell wall of algae is made up of which substance?  
 (A) Protein                      (B) Mannans                      (C) Lipid                      (D) a,b,c-all
9. The cells involved in large amount of lipid synthesis, do not possess this organelle on Endoplasmicreticulum.  
 (A) Mitochondrion                      (B) Ribosomes  
 (C) Golgi apparatus                      (D) lysosome
10. In mitochondria, it contains F-particles.  
 (A) Matrix                      (B) Cristae                      (C) Outer layer                      (D) a-b-c,all
11. The materials essential for dark reaction are located in  
 (A) Circular-DNA                      (B) Thylakoids                      (C) Stroma                      (D) Ribosomes
12. Microfilaments are made up of  
 (A) Fat                      (B) Protein                      (C)Carbohydrates                      (D) Nucleic acid
13. It possess Flagella.  
 (A) Paramecium                      (B) Euglena                      (C) Amoeba                      (D)Yeast
14. It directs formation of the bipolar spindle during cell division.  
 (A) Golgi body                      (B) Centriole                      (C) Ribosome                      (D) Cilia
15. In human which cell lacks nucleus.  
 (A) Lymphocyte                      (B) RBC                      (C) Monocytes                      (D) Neutrophils
16. The unit of phloem in which nucleus is absent.  
 (A) Sieve cell                      (B) Sieve tube  
 (C) Companion cell                      (D) Phloem parenchyma
17. No membrane surrounds in this organelle.  
 (A)Lysosome                      (B)Nucleolus                      (C)Golgi body                      (D)Nucleus
18. It actively synthesized r-RNA.  
 (A) Nucleoplasm                      (B) Nucleolus                      (C)Nucleus                      (D)a-b-c,all
19. In each chromosome centromere possessing disc shaped structure is  
 (A) Satellite                      (B) Kinetochore                      (C) Long arm                      (D) Short arm
20. Bacteria possess small DNA other than circular DNA which is called as...  
 (A) Cosmid                      (B) Plasmid                      (C) Plastid                      (D) Starid

21. It shows presence of Nucleoid.  
 (A) Plant cell                      (B) Bacteria                      (C) Animal cell                      (D) Virus
22. The cell wall of fungi is made up of which substance?  
 (A) Starch                      (B) Chitin                      (C) Cellulose                      (D) Pectin
23. Which organelle is not considered as a part of Endomembrane system?  
 (A) Vacuole                      (B) Chloroplast  
 (C) Endoplasmic reticulum                      (D) Lyso some
24. Chromosome in which centromere is located at the end is....  
 (A) Acrocentric                      (B) Telo centric  
 (C) Meta centric                      (D) Sub-meta centric
25. Select unicellular organism which possess cillia.  
 (A) Amoeba                      (B) Paramoecium                      (C) Yeast                      (D) Opalina
26. Which is the example of unicellular organism?  
 (A) Chlamydomonas                      (B) Spirogyra                      (C) Mushroom                      (D) Chiton
27. Who mentioned that cells had a thin layer around them?  
 (A) Schwann                      (B) Virchow                      (C) Schleiden                      (D) Robert Hook
28. Who mention that the presence of a cell wall is an unique character of the plant cell?  
 (A) Schwann                      (B) Virchow                      (C) Schleiden                      (D) Robert Brown
29. Which organelles are found only in animal cell?  
 (A) Centriole                      (B) Mitochondria                      (C) Golgi apparatus                      (D) Chloroplast
30. Which is biggest animal cell?  
 (A) Ostrich's egg                      (B) Hen's egg                      (C) PPLO                      (D) Mycoplasma
31. In some of Bacteria the outer-most layer is a loose sheath layer called as....  
 (A) Slime layer                      (B) Capsule                      (C) Cell membrane                      (D) Glucocalyx
32. What is the function of SER?  
 (A) Synthesis of Steroid hormone                      (B) Synthesis of protein  
 (C) Synthesis of enzyme                      (D) a,b,c,all
33. How many unit occur in each stackpile of golgi apparatus?  
 (A) 4 to 8                      (B) 2 to 6                      (C) 4 to 6                      (D) 2 to 8
34. What is produce when vesicle are separated from golgi body?  
 (A) Lysosome                      (B) Vacuoles                      (C) Ribosomes                      (D) Chloroplast
35. The area the cytoplasm without any cytoplasm are called as...  
 (A) Vacuoles                      (B) Chloroplast                      (C) Cytoplasmic Gap                      (D) Mitochondria
36. Which organelle is responsible for degradation of worn out cells?  
 (A) Lysosome                      (B) Golgi apparatus  
 (C) Vacuoles                      (D) Endoplasmic Reticulum

37. What is the diameter of mitochondrion?  
 (A) 0.2-1.0  $\mu$  m      (B) 1.0-4.1  $\mu$  m      (C) 0.02-0.10  $\mu$  m      (D) 1.5-2.5  $\mu$  m
38. What is the length of mitochondrion?  
 (A) 1.0-4.1  $\mu$  m      (B) 0.2-1.0  $\mu$  m      (C) 2.5-2.8  $\mu$  m      (D) 1.9-6.4  $\mu$  m
39. which plastid is not included as a chromoplast?  
 (A) Chloroplast      (B) Carotene      (C) Xanthophyllus      (D) Anthrocyanin
40. Which plastids possess chlorophyll pigments?  
 (A) Chloroplast      (B) Xanthophyllus      (C) Anthrocyanin      (D) Carotene
41. How many grana present in one chloroplast?  
 (A) 40-60      (B) 42-47      (C) 60-80      (D) 02-100
42. Each granum possesses how many thylakoids?  
 (A) 02-100      (B) 90-93      (C) 19-89      (D) 19-38
43. In peripheral region of centriole nine triplets are arranged at which angles?  
 (A) 40°      (B) 60°      (C) 30°      (D) 90°
44. This organelle possesses 9+0 structure.  
 (A) Centriole      (B) Cillia      (C) Flagella      (D) a,b,c-all
45. Various colours in flower fruit and seeds are due to presence of which pigment?  
 (A) Anthocyanin      (B) Chlorophyll      (C) Chloroplast      (D) a,b,c-all
46. What is the diameter of cisternae in golgi apparatus?  
 (A) 0.5  $\mu$  m-1  $\mu$  m      (B) 0.5 mm-1 mm      (C) 5  $\mu$  m-10  $\mu$  m      (D) 0.05  $\mu$  m-1  $\mu$  m
47. Which organelle possess hydrolase enzyme?  
 (A) Lysosome      (B) Golgi apparatus      (C) Mitochondria      (D) Chloroplast
48. The leucoplast which stores protein is known as...  
 (A) Aleuroplasts      (B) Chloroplasts      (C) Amyloplasts      (D) Elaioplasts
49. The protoplast surrounding the centriole is called as...  
 (A) Centrosphere      (B) Centrofibre      (C) Centroradus      (D) centroboides
50. Like zygote any cell of the body is capable of producing a new individual is known as...  
 (A) Totipotency      (B) Differentiation      (C) Growth      (D) Reproduction
51. Which organelle is associated in the formation of basal granules, cillia and flagella?  
 (A) Centrosome      (B) Golgi apparatus      (C) Mitochondra      (D) Lysosome
52. The number of mitochondria per cell depends upon the...  
 (A) Physiological activity of the cell      (B) Types of cell  
 (C) Shape of cell      (D) Size of cell
53. How many basic shapes of Bacteria are there ?  
 (A) 4      (B) 6      (C) 9      (D) 1
54. Which structure serves as a protective layer against attack by phagocytes and by viruses?  
 (A) Capsule      (B) Appendages      (C) Mesosome      (D) Mitochondria

55. How much diameter of ribosome in prokaryotic cell?  
 (A) 20 nm                      (B) 40 nm                      (C) 10 nm                      (D) 15 nm
56. Which organelle possesses circular DNA?  
 (A) Chloroplast                      (B) Lysosome                      (C) Ribosome                      (D) Golgi apparatus

**Assertion (P) and (Q) type Questions:**

- (a) Assertion (A) and Reason (R) both are true and reason (B) is correct explanation of the assertion A.  
 (b) Assertion (A) and Reason (R) both are true but reason B is not a correct explanation of the assertion (A)  
 (c) Assertion (A) is true but Reason (B) is false.  
 (d) Assertion (A) is false but Reason B is true.
57. (A) Cell is a structural and functional unit of living organisms.  
 (R) New cells are not formed by cell division of preexisting cells.  
 (a)                      (b)                      (c)                      (d)
58. (A) The blue green algae is a prokaryotic.  
 (R) The blue green algae possess 70s ribosomes.  
 (a)                      (b)                      (c)                      (d)
59. (A) Some Bacteria are gram-negative.  
 (R) Ferrocute can be stained by Gram stain.  
 (a)                      (b)                      (c)                      (d)
60. (A) In mitochondria inner layer has many folding which is known as cristae.  
 (R) In cristae ETS occurs.  
 (a)                      (b)                      (c)                      (d)
61. (A) Mesosome are formed by a specialized differentiated form of cell membrane.  
 (R) Cell membrane is the lamellas envelop.  
 (a)                      (b)                      (c)                      (d)
62. (A) Ribosome is non membrane organelles.  
 (R) Ribosomes are the site of protein synthesis  
 (a)                      (b)                      (c)                      (d)
63. (A) Blue green algae is a prokaryotic cell:  
 (R) In prokaryotic cell, cell division occur very fast.  
 (a)                      (b)                      (c)                      (d)
64. (A) Aleuroplasts stores proteins.  
 (R) Amyloplasts stores starch  
 (a)                      (b)                      (c)                      (d)
65. (A) Mitochondria is known as power house of cell.  
 (R) ATP is known as energy currency of the cell  
 (a)                      (b)                      (c)                      (d)

66. (A) Cilia and Flagella possess 9+2 arrangement.  
 (R) Centrosome possesses 9+0 arrangement.  
 (a) (b) (c) (d)
67. (A) Nucleolus and ribosome are non membrane organelle.  
 (R) Nucleolus and ribosome are associated with different functions  
 (a) (b) (c) (d)
68. (A) Mitochondria, Chloroplast possesses circular DNA  
 (R) Mitochondria are self replicating organelles.  
 (a) (b) (c) (d)
69. (A) Nucleus possess Chromosomes and DNA  
 (R) DNA is responsible for inheritance of characters.  
 (a) (b) (c) (d)
70. (A) The living organism possesses unicellular or multicellular structure.  
 (R) The Life span of living organisms start with zygote.  
 (a) (b) (c) (d)
71. (A) Animal cell possesses centriole.  
 (R) some algae also possesses centriole  
 (a) (b) (c) (d)
72. (A) The cytoplasm contain microbodies  
 (R) The microbodies are not bound by membrane.  
 (a) (b) (c) (d)
73. Select the Correct option from Column-I and Column-II

**Column-I**

**Column-II**

- |                         |     |                   |
|-------------------------|-----|-------------------|
| (P) Typical Animal Cell | i   | multi nucleus     |
| (Q) Zygote              | ii  | Uninucleus        |
| (R) Human RBC           | iii | Binucleus         |
| (S) Plant Endosperm     | iv  | Nucleus is absent |
- (a) P - ii    Q - iii    (C) R - iv    (D) S - i  
 (b) P - iii    Q - ii    (C) R - i    (D) S - iv  
 (c) P - iii    Q - i    (C) R - iv    (D) S - ii  
 (d) P - i    Q - ii    (C) R - iv    (D) S - iii

74. Select the Correct option from Column-I and Column-II

**Column-I**

**Column-II**

- |                                |     |            |
|--------------------------------|-----|------------|
| P Micro filaments              | i   | Glycocalyx |
| Q Micro tubules                | ii  | Actin      |
| R Flagella                     | iii | Tubulin    |
| S Outer most layer of bacteria | iv  | Flagellin  |



- (a) (P - ii) (Q - iii) (R - iv) (S - iv)                      (c) (P - ii) (Q - iii) (R - i) (S - iii)  
 (b) (P - ii) (Q - ii) (R - iv) (S - i)                      (d) (P - iv) (Q - i) (R - iii) (S - ii)

75. In Column-I Organell and in Column-II its function is given, select correct option

<b>Cloumn-I</b>	<b>Column-II</b>
P Mitochondria	1 Suicide bag
Q Chloroplast	2 Synthesis of steroids
R Lysosome	3 Photosynthesis
S SER	4 ATP- formation and storage
(A) (P - 4) (Q - 3) (R - 1) (S - 2)	(C) (P - 4) (Q - 3) (R - 2) (S - 1)
(B) (P - 2) (Q - 1) (R - 4) (S - 3)	(D) (P - 1) (Q - 2) (R - 3) (S - 4)

76. Select the Correct option from Cloumn-I and Column-II

<b>Cloumn-I</b>	<b>Column-II</b>
P Robert Hook	1 Cell theory
Q Robert Brown	2 Golgi apparats
R Schieiden	3 Cell
S Camilo Golgi	4 Nucleus
(A) (P - 3) (Q - 4) (R - 1) (S - 2)	(C) (P - 2) (Q - 1) (R - 3) (S - 4)
(B) (P - 1) (Q - 2) (R - 4) (S - 3)	(D) (P - 4) (Q - 2) (R - 1) (S - 3)

77. Select the Correct option from Cloumn-I and Column-II

<b>Cloumn-I</b>	<b>Column-II</b>
P Chloroplast	1 Single layer structure
Q Lysosomes	2 Double layered
R Nucleolus	3 without membrane
(A) (P - 3) (Q - 1) (R - 2)	
(B) (P - 1) (Q - 2) (R - 3)	
(C) (P - 2) (Q - 3) (R - 1)	

78. Select mismatch option

(A) Centriole	9 + 0
(B) Cillia	9 + 2
(C) Fimbriae	Conjugation
(D) middle lamella	Lignin

79. Select Correct option

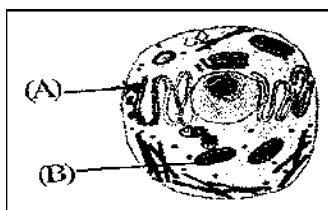
(A) Lysosome	-	Sucidal bag
(B) Ribosome	-	Lipid synthesis
(C) Mitochondria	-	Grana
(D) SER	-	Prokaryotic Cell

80. Which assertion is false ?  
 (a) Sucidal bag possess double layer structure  
 (b) Mitochondria are self replicating organelles  
 (c) Virchow give the final shape of the cell theory  
 (d) Active transport occurs against the concentration gradient
81. What is main difference between active and passive transport? (CBSE 1993)  
 (a) Active transport occurs by ATP. (b) Active transport occurs fast.  
 (c) Energy is necessary for passive transport. (d) Passive transport is a non-selective transport.
82. Where the Chlorophyll is present in chloroplast? (CBSE-2005)  
 (a) In thyllakoid (b) In Stroma (c) In grana and stroma (d) In outer membrane
83. Select, which assertion is false. (CBSE-2007)  
 (a) Chloroplast and mitochondria both possess internal variation. Thylakoid lumen is not covered by thylakoid membrane.  
 (b) Chloroplast and mitochondria both possess DNA.  
 (c) Chloroplast and mitochondria both possess external and internal membrane.  
 (d) Normally chloroplast is larger than mitochondria
84. In plant cell vacuole is \_\_\_\_\_. (CBSE-2008)  
 (a) Membrane bound structure which stores various substance and excrete them.  
 (b) Without membranous structure.  
 (c) Without membranous structure which stores protein and lipid  
 (d) With membranous structure which stores protein and lipid.
85. Middle lamella is made up of which substance? (CBSE-2009)  
 (a) Calcium pectate (b) Hemicellulose (c) Muramic acid (d) Phosphoglyceride
86. In higher plant stroma of chloroplast possesses...  
 (a) Enzyme for dark reaction. (b) Chlorophyll  
 (c) Ribosomes (d) Light reaction related enzyme.
87. Microfilaments are \_\_\_\_\_. (CBSE-2009)  
 (a) Structure connects cytoplasm of two near by cells  
 (b) Locomotive structure  
 (c) Structure joints nucleus and cytoplasm  
 (d) Lignified layers between two cells.
88. The subunits of prokaryotic ribosomes are \_\_\_\_\_. (Kerala PMP-2001)  
 (a) 50S + 30S (b) 60S + 40S (c) 40S + 30S (d) 60S + 50S
89. In which phase the chromosomes appear clear. (BHU-2001)  
 (a) Metaphase (b) Telophase (c) Prophase (d) Anaphase

90. The plasma membrane is made up of \_\_\_\_\_ . (JKCET-2001)  
 (a) Protein and lipid (b) Only lipid  
 (c) Carbohydrate and lipid (d) Carbohydrate and protein
91. Smooth endoplasmic reticulum is a synthesis site of which substance? (Kerala PMT-2002)  
 (a) Lipid (b) Protein (c) Carbohydrate (d) Nucleic acid
92. In the following which sentence is false? (JIPMER-2002)  
 (a) Lysosome possesses double layer structure. (b) Lysosome is a suicidal bag.  
 (c) Lysosome digests all macromolecules. (d) Lysosome possesses hydrolase enzyme.
93. "Cell is a structural and functional unit of organisms". who found out? (JKCMEE-2005)  
 (a) Schleiden and schwann (b) Robert Hook  
 (c) Aristotal (d) Mendel
94. Prokaryotics differ form eukaryotics in \_\_\_\_\_. (JIPMER-2005)  
 (a) Cell wall and DNA (b) Plasma membrane and nucleus  
 (c) Plastid and nucleus (d) DNA and mitochondria
95. What is correct about Fluid-mosaic model? (JKCMET-2004)  
 (a) A lipid bilayer and protein included in it.  
 (b) Above protein layer, one layer of phospholipid is present  
 (c) Above protein layer, two layer of phospholipid is present  
 (d) Protein bilayer and phospholipid is included in it.
96. Select the correct option from column - I and column - II (Kerala PMT-2005)
- | <b>Column - I</b>           | <b>Column - II</b>               |
|-----------------------------|----------------------------------|
| (P) Endoplasmic reticulum   | (1) Power house of cell          |
| (Q) Free Ribosomes          | (2) Osmoregulation and excretion |
| (R) Mitochondria            | (3) Lipid synthesis              |
| (S) Contractile vacuole     | (4) Protein synthesis            |
| (A) (P-3) (Q-4) (R-1) (S-2) | (B) (P-1) (Q-2) (R-4) (S-3)      |
| (C) (P-3) (Q-2) (R-1) (S-4) | (D) (P-3) (Q-4) (R-2) (S-1)      |
97. Nucleolus is \_\_\_\_\_. (RCET-2007)  
 (A) Located in nucleus, Possess r-RNA and chromatin and possess a spherical structure.  
 (b) Rod like structure present near nucleus.  
 (c) Spherical structure present in cytoplasm near nucleus.  
 (d) None of these
98. Aldolase enzyme related with which organelles? (CET-2005)  
 (a) Cell-matrix (b) Chloroplast (c) Nucleus (d) Mitochondria
99. Mitochondria stores... (Dy patil pune-2006)  
 (a) ATP (b) Protein (c) Carbohydrate (d) Lipid

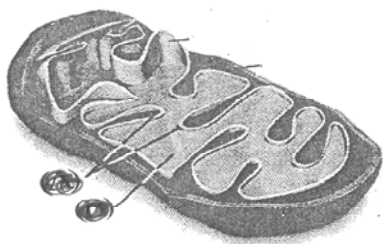
100. For the synthesis of new protein and protein transport which organelle is related?(AIPMT-2005)  
 (a)Endoplasmic reticulum (b)Chloroplast (c)Mitochondria (d)Lysosome
101. Where,ribosomes synthesis takes place? (AIPMT-2000)  
 (a) Nucleolus (b) Nucleus (c) Golgi body (d) Plasma membrane
102. Golgi apparatus is produced from which organelle ? (AFMC-2003)  
 (a) Endoplasmic reticulum (b) Plasmamembrane  
 (c) Mitochondria (d) Ribosomes
103. It is a power house of cell. (AFMC-1998,2001)  
 (a) Mitochondria (b) Chloroplast  
 (c) Nucleus (d) Golgi-apparatus
104. Mitochondria is organelle of which process? (Orissa JEE-2003)  
 (a) Kreb's cycle (b) Glycolysis (c) Hill reaction (d) Calvin cycle
105. Where ETS Occur's? (CPMT-2008)  
 (a) Inner membrane of mitochondria (b) Outer membrane of mitochondria  
 (c) Matrix of mitochondria (d) None
106. Cytoskeleton is made up of \_\_\_\_\_. (CBSE-2009)  
 (a) Proteinous fibre (b) micro particles of  $\text{CaCO}_3$   
 (c) Cellulose (d) Callose
107. In higher plants cell wall is made up of which substance? (CPMT-1995)  
 (a) Cellulose (b) Peptidoglycan (c) Lipoprotein (D) Callose
108. In Eukaryotic cell cytoskeleton is made up of \_\_\_\_\_ (DPMT-1997)  
 (a) Microtubules (b) Microfilaments (c) Tubulin (d) all
109. Who suggested that new cell arise through cell division of preexisting cells? (Pb.PMT-1992)  
 (a) Virchow (b) Schwann (c) Robert Hook (d) Schleidn
110. Which organelle is observed in animal cell but absent in plant cell? (Manipal-1997)  
 (a) Centriole (b) Mitochondria  
 (c) Endoplasmic reticulum (d) Golgi apparatus
111. Who proposed fluid-mosaic model?  
 (a) Singer and Nicolson (b) Beadel and Tatum  
 (c) Robertson and Miller (d) Watson and Crick
112. Which type of arrangement is shown by flagella of eukaryotic cell? (CET-1992)  
 (a) 9+2 Arrangement (b) 2+9 Arrengement (c) 7+2 Arrangement (d) 9+0 Arrangement
113. Microtubules are made up of by which protein? (Kerala PMT-2001)  
 (a) Tubulin (b) Myosin (c) Actin (d) Durable protein
114. Bacteria possess which type of ribosomes? (Kerala PMT-2004)  
 (a) 70S (b) 80S (c) 60S (d) 40S

115. \_\_\_\_\_ is a currency of the energy. (Pb PMT-2004)  
 (a) ATP (b) NAD (c) FAD (d) Glucose
116. \_\_\_\_\_ is a site for synthesis of glycolipids and glycoproteins. (CBSE-2011)  
 (a) Golgi apparatus (b) Lysosome (c) Plastid (d) Mitochondria
117. The Organelle, which is related with production of ATP is \_\_\_\_\_. (Pb PMT-2004)  
 (a) Mitochondria (b) Ribosomes  
 (c) Golgi apparatus (d) Endoplasmic reticulum
118. How many layers are there in the structure of thylakoid? (AMV-2003)  
 (a) 2 (b) 3 (c) 4 (d) 5
119. Each ribosome are made up of how many subunits? (Jharkhand-2003)  
 (a) 2 (b) 3 (c) 4 (d) 5
120. Give name of organelle, which is surrounded by a single layered wall. (RPMT-1995)  
 (a) Lysosome (b) Mitochondria (c) Chloroplast (d) Nucleus
121. Give the name of suicidal bag of plant cell. (Orissa JEE-2006)  
 (a) Lysosome (b) Mitochondria (c) Endoplasmic reticulum (d) Nucleus
122. In the following diagram what do A and B indicate ?



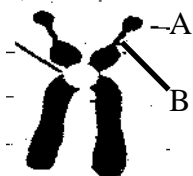
- (a) SER, Mitochondria  
 (b) Ribosome, Mitochondria  
 (c) Mitochondria, Golgi apparatus  
 (d) RER, Mitochondria

123. Given diagram is well known as a...



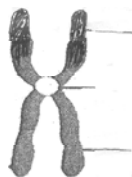
- (a) Power house of cell  
 (b) Kitchen of cell  
 (c) Suicidal bag of cell  
 (d) Regulator of cell

124. Give the names of A and B in the given diagram.



- (a) Stalk, Satellite  
 (b) Centromere, Satellite  
 (c) Satellite, Stalk  
 (d) Satellite, Centromere

125. Mention the type of chromosome in the given diagram.



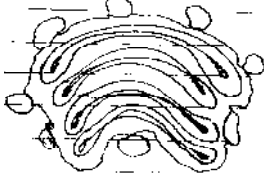
- (a) Metacentric  
 (b) Sub-Metacentric  
 (c) Acrocentric  
 (d) Telocentric

126. What A and B indicate in the given diagram.



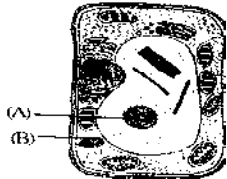
- (a) Pili, Flagella
- (b) Ribosomes, Pili
- (c) Cell wall, Nucleoid
- (d) Flagella, Capsule

127. Given diagram indicate which organelle?]



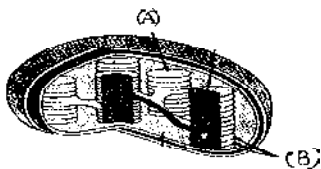
- (a) Mitochondria
- (b) Chloroplast
- (c) Golgi apparatus
- (d) Endoplasmic reticulum

128. Given the name of A and B in the given diagram.



- (a) Crystals, Starch granules
- (b) Vacuoles, Nucleus
- (c) Mitochondria, Golgi apparatus
- (d) Golgi apparatus, chloroplast

129. What A and B indicate in the given diagram.



- (a) Granum, Stroma
- (b) Granum, Thylakoids
- (c) Stroma, Thylakoids
- (d) Lumen, Granum

130. What A and B indicate in the given diagram?



- (a) Nucleolus, Nuclear membrane
- (b) Nucleus, Chromatin
- (c) Nucleus, Nucleolus
- (d) Chromosome, Nuclear membrane

**ANSWER KEY**

1	b	28	a	55	a	82	a	109	a
2	b	29	a	56	a	83	a	110	a
3	b	30	a	57	c	84	a	111	a
4	b	31	a	58	a	85	a	112	a
5	b	32	a	59	b	86	a	113	a
6	b	33	a	60	b	87	a	114	a
7	b	34	a	61	a	88	a	115	a
8	b	35	a	62	b	89	a	116	a
9	b	36	a	63	a	90	a	117	a
10	b	37	a	64	b	91	a	118	a
11	b	38	a	65	b	92	a	119	a
12	b	39	a	66	b	93	a	120	a
13	b	40	a	67	c	94	a	121	a
14	b	41	a	68	b	95	a	122	b
15	b	42	a	69	a	96	a	123	a
16	b	43	a	70	a	97	a	124	c
17	b	44	a	71	b	98	a	125	a
18	b	45	a	72	c	99	a	126	b
19	b	46	a	73	a	100	a	127	c
20	b	47	a	74	a	101	a	128	a
21	b	48	a	75	a	102	a	129	b
22	b	49	a	76	a	103	a	130	c
23	b	50	a	77	a	104	a		
24	b	51	a	78	d	105	a		
25	b	52	a	79	a	106	a		
26	a	53	a	80	a	107	a		
27	a	54	a	81	a	108	a		



## Unit - III

### Chapter 11 Biomolecules-1

#### IMPORTANT POINTS

- The Substances which are formed due to bond formation between C and H are called organic substances.  
 A carbohydrate molecule contains Carbon, Hydrogen, and Oxygen. The ratio of H and O is generally 2 : 1 as water (H<sub>2</sub>O)
- Carbohydrates have the general formula of C<sub>n</sub>(H<sub>2</sub>O)<sub>m</sub>.
  - Carbohydrates can be divided into three main types. These are,
    - Monosaccharides (single sugar unit)
    - Disaccharides (two sugar unit)
    - Polysaccharide (many sugar unit)
  - Different monosaccharides contain different numbers of carbon atoms.  
 Trioses contain three, Pentoses contain five, and Hexoses six.
  - Carbohydrates have many different functions and come in many different forms.
  - Ribose and Deoxy ribose are both pentose monosaccharide and are found in RNA and DNA.
  - Lipids are of three types,
    - i Simple lipids
    - ii Complex lipids
    - iii Steroids.
  - Lipids are the food stuffs of highest Calorific value and they are stored in the body as a reserve food.

1. Match the terms in columns – I with suitable terms in column – II :

Column – I	Column – II
P, Glucose	i (C <sub>6</sub> H <sub>10</sub> O <sub>5</sub> ) <sub>n</sub>
Q, Maltose	ii R-COOH
R, Glycogen	iii (CH <sub>2</sub> O) <sub>n=m</sub>
S, Fatty acids	iv C <sub>n</sub> (H <sub>2</sub> O) <sub>n-1</sub>

- a) P iv Q i R iii S ii  
 b) P iv Q iii R i S ii  
 c) P iii Q iv R ii S i  
 d) P iii Q iii R i S ii

2. Match the terms in column-I with suitable terms in column-II

Column – I	Column – II
P C <sub>6</sub> H <sub>10</sub> O <sub>5</sub>	i Glyceraldehyde
Q C <sub>3</sub> H <sub>6</sub> O <sub>3</sub>	ii Galactose
R C <sub>5</sub> H <sub>10</sub> O <sub>4</sub>	iii Ribulose
S C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	iv Deoxy ribose sugar



- a) P i Q iii R ii S iv  
 b) P iv Q iii R ii S i  
 c) P iii Q i R iv S ii  
 d) P i Q iii R ii S iv
3. Match the terms in column-I with suitable terms in column-II.

**Column – I      Column – II**

P Butyric acid      i Long chain Unsaturated fatty acid  
 Q Stearic acid      ii Short chain Unsaturated fatty acid  
 R Oleic acid      iii Short chain Saturated fatty acid  
 S Crotonic acid      iv Long chain Saturated fatty acid

- a) P iii Q iv R i S ii  
 b) P iii Q i R iv S ii  
 c) P iv Q iii R i S ii  
 d) P iv Q iii R ii S I
4. Match the terms in column-I with suitable terms in column-II.

**Column – I      Column – II**

P Glucose      i Stored food in plants  
 Q Cellulose      ii Reserve food in animals  
 R Starch      iii The plant cell wall  
 S Glycogen      iv Most widely used in respiration

- a) P iv Q iii R ii S i  
 b) P iv Q iii R i S ii  
 c) P iii Q i R iv S ii  
 d) P iii Q iv R ii S i
5. Match the terms in column-I with suitable terms in column-II.

**Column – I      Column – II**

P Glycosidic bond      i Triglycerides  
 Q Ester bond      ii Dinucleotide  
 R Peptide bond      iii Disaccharide  
 S Phosphodiester bond      iv Dipeptide

- a) P i Q iii R ii S iv  
 b) P iii Q iv R i S ii  
 c) P iii Q i R iv S ii  
 d) P ii Q iv R iv S iii

6. Match the terms in column-I with suitable terms in column-II

**Column – I**

**Column – II**

P PGAL

i The plant cell wall

Q Oleic acid

ii Plasma membrane and membrane of organelles.

R Glycerol

iii Unsaturated fatty acid

S Phospholipid

iv Phosphate aldotriose sugar

T Cellulose

v Trihydroxy alcohol

a) P v Q iv R i S ii T iii

b) P iv Q v R ii S i T iii

c) P iii Q iv R ii S v T i

d) P iv Q iii R v S ii T i

7. Which the following is the word regarding steroids is not correct?

a) Cortisone    b) Progesterone

b) Glycolipid    d) Ergosterol

8. Which of the following statement regarding to properties of starch is not correct?

a) Present of amylose and amylopectin chains.

b) Stored food in plants.

c) Soluble in water.

d) Not sweet.

9. Which one of the following pairs is not correctly matched?

a) Triose sugar → Glyceraldehyde → Aldo sugar.

b) Pentose sugar → Ribulose → Keto sugar.

c) Hexoses sugar → Fructose → Aldo sugar.

d) Triose sugar → Dihydroxy acetose → Keto sugar.

10. Which the following pair regarding to biological importance of carbohydrates is not correctly matched?

a) Cellulose → Forms the plant cell wall.

b) Glycogen → Reserve food in animals.

c) Ribose sugar → Structural components of ATP.

d) Galactose → The most widely used in respiration.

11. Which the following regarding to examples of Keto sugar is not correctly?

a) Fructose    b) Ribulose    b) Ribose sugar    d) Dihydroxy acetose.

12. Which of the following pairs is not correctly matched?

a) Butter – Glycerol + 3 Fatty acids.

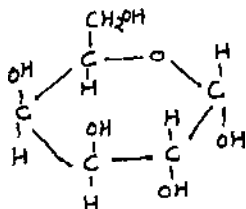
b) Waxes – Monohydroxy alcohol + 1 Fatty acid.

c) Cortisone – Present of –COOH or >C=O group.

d) Glycolipid – Glycerol + Lipid.

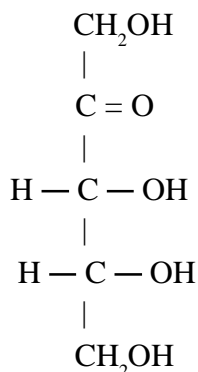
13. Which of the following option is not correctly for this molecule?  
 a) It is Keto hexoses sugar.            b) Hydrolysis of a molecule of maltose  
 c) It can pass through the cell membrane      d) Found in the juice of fruits.
14. Which one of the following pairs is not correctly matched?  
 a) Galactose – Lactose  
 b) Fructose – Glucose  
 c) Fructose – Galactose  
 d) Ribose – Deoxyribose.
15. Which one of the following pairs is not correctly matched?  
 a) Triose sugar – DHAP.  
 b) Starch – amylase and amylopectin.  
 c) Phospholipid – plasma membrane.  
 d) Cortisone – sterols.
16. Which one of the following pairs is correctly matched?  
 a) Fats → Long saturated Fatty acids chain.  
 b) Derivatives of Lipid → Vitamins A, D, E.  
 c) Deoxyribose → RNA.  
 d) Glycogen → Forms the plant cell wall.
17. Lipids are relatively insoluble in...  
 a) Chloroform                      b) Water  
 b) Benzene                          d) Ether.
18. Which of the following statement regarding the Fatty acid is not correct?  
 a) Unsaturated fatty acids are two successive carbon atoms at certain places therein are linked by a double bond.  
 b) Saturated fatty acids are capable of accepting hydrogen or halogen atoms.  
 c) Butyric acid and palmitic acids are Saturated fatty acids  
 d) Crotonic acid and oleic acid are Unsaturated fatty acids.
19. Which of the following statement regarding to Lipid is not correct?  
 a) Lipids are of three types i Simple ii Complex iii Steroids  
 b) The lipids are a heterogenous group of compounds related to Fatty acids.  
 c) Lipids are the important constituents of the diet because of their high energy value.  
 d) Lipids are formed of C, H and O atoms, The number of H atom is less than ahat of O.
20. Which of the following statement regarding to Amylase is not correct?  
 a) Unbranched polysaccharide chains made up of glucose units.  
 b) Amylase occur in the constitution of glycogen.  
 c) Amylase occur in more amount in starch.  
 d) None of these.

21. Which of the following statements are true?  
 P: Those which have molecular weights 596 Dalton are called micromolecules.  
 Q: Those which have molecular weights 1288 Dalton are called macromolecules.  
 R: Lipids have molecular weight more than ten thousand Dalton and above.  
 S: Biomolecules are of three types (i) micromolecules (ii) simply biomolecules and (iii) macromolecules.
- a) P and Q                      b) P, Q and R  
 c) R and S                      d) Q and S.
22. Which of the following options suggest number of carbons in descending order?  
 P Fructose Q Palmitic acid. R Ribulose S Oleic acid.
- a) R → Q → P → S  
 b) R → P → Q → S  
 c) S → Q → P → R  
 d) S → P → Q → R
23. In the formation of triglyceride, glycerol get linked with any Fatty acids by...  
 a)  $-NH_2$     b)  $-COOH$     c)  $-CHO$     d)  $>C=O$
- Which of the following the correct option for statement P and statement Q.
- (A) If both 'A' and 'R' true and 'R' is a correct explanation of 'A'  
 (B) If both 'A' and 'R' true and 'R' is not a correct explanation of 'A'  
 (C) If A is true the R is false  
 (D) If A is false the R is true
24. P: Steroids do not contain Fatty acids.  
 Q: In the structure of wax an alcohol molecule is one monohydroxy alcohol
25. P: The presence of lipid is inevitable for the activity of glucose phosphatase.  
 Q: Copper is co-factor for the activation of enzymes like phosphatase.
26. P: Cortisone molecules which contain only Carboxyl ( $-COOH$ ) or keto  $C>C=O$  group.  
 Q: Cortisone do not contain Fatty acids.
27. P: In animal the food is stored as glycogen  
 Q: Amylase and amylopectin are occurring in the constitution of glycogen.
28. Which of the following structure shows the molecules?



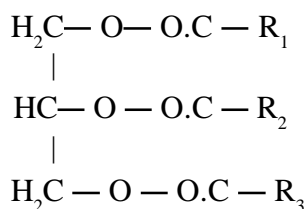
- a) Glucose  
 b) Fructose  
 c) Galactose  
 d) None of these

29. Which of the following structure show the types of sugar?



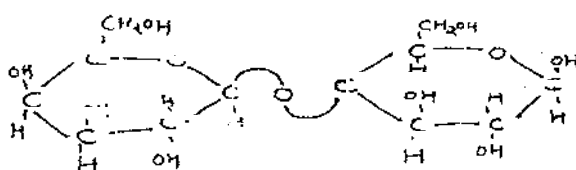
- a) Aldo triose sugar
- b) Aldo pentose sugar
- c) Keto triose sugar
- d) Keto pentose sugar

30) Which molecules are the consist of a following molecule structure?



- a) 3 glycerol + 1 fatty acid
- b) 1 glycerol + 3 fatty acid
- c) 3 glycerol + 3 fatty acid
- d) glycerol + fatty acid

31) Which of the following the general formula of Carbohydrate?



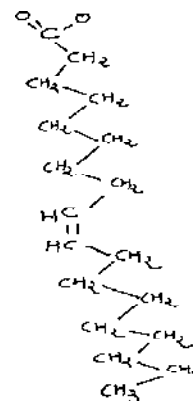
- a)  $\text{C}_n(\text{H}_2\text{O})_m$
- b)  $\text{C}_n(\text{H}_2\text{O})_{n-1}$
- c)  $(\text{C}_6\text{H}_{10}\text{O}_5)_n$
- d) None of these.

32) Which sentence is suitable for the following structure?

- a) Short chain saturated Fatty acid
- b) Short chain unsaturated Fatty acid
- c) Long chain unsaturated Fatty acid
- d) Long chain saturated Fatty acid

33) Specify the name of the fatty acids of the following structure in a given figure?

- a) Butyric acid
- b) Palmitic acid
- c) Stearic acid
- d) Oleic acid



**Read the assertion and reason carefully to mark the correct option out of the options given below:**

- a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- b) If both the assertion and the reason are true and the reason is not a correct explanation of the assertion.
- c) Assertion is true but the reason is false.
- d) Assertion is false but the reason is True
- 34) A: Cholesterol do not contain Fatty acids.  
R: Cholesterol do not contain Carboxyl (- COOH) or Keto (>C=O) group.  
(a) (b) (c) (d)
35. A: Palmitic acids are long chain unsaturated fatty acid.  
R: Two successive carbon atoms at certain places there in are linked by double bond.  
(a) (b) (c) (d).
36. A: Amylopectin chains occur in the constitution of glycogen.  
R: In animal the food is stored as glycogen.  
(a) (b) (c) (d)
37. A: Lipids are insoluble in water.  
R: In structure of lipid the number of H atoms is much more than that of O.  
(a) (b) (c) (d)
38. A: Vitamins A, D and E are fat soluble  
R: Vitamins D and E are synthesized from the derivatives of lipids  
(a) (b) (c) (d)
39. A: Hydrolysis of a molecule of sucrose yields glucose + fructose.  
R: Hydrolysis of disaccharide yields two molecules of monosaccharide.  
(a) (b) (c) (d)
40. A: DHAP is an example of the phosphate of ketotriose sugar.  
R: DHAP formed during respiration.  
(a) (b) (c) (d)
41. A: Polysaccharide, Proteins compounds have molecular weights in the range of ten thousand Daltons and above.  
R: The exception of Lipids, have molecular weights in the range of ten thousand Daltons and above.  
(a) (b) (c) (d)
42. A: The myelin sheath around the nerve fibre contain lipid.  
R: That prevents the passage of nerve impulses in the adjacent nerve fibres.  
(a) (b) (c) (d)

43. A : In acts as a solvent for fat soluble vitamins .  
 R : Vitamins A, B, C, E are fat soluble.  
 (a) (b) (c) (d)
44. A : Complex lipid which contain a non lipid constituent in addition ti alcohol and fatty acids.  
 R : Phospholipid and Glycolipid are example of complex lipid  
 (a) (b) (c) (d)
45. A : The general formula of disaccharide is  $C_n(H_2O)_{n-1}$   
 R : The formula of sucrose is  $C_{12}H_{22}O_{11}$ .  
 (a) (b) (c) (d)
46. A : Oleic acid contain 18 carbon atoms and two successive carbon atoms at certain places therein are linked by double bond.  
 R : Oleic acid are long chain unsaturated fatty acid.  
 (a) (b) (c) (d)
47. A : In the structure of wax one molecule of monohydroxy alcohol.  
 R : Lipids such as wax form a protective layer on the outer surface of the aerial plant organs.  
 (a) (b) (c) (d)
48. A: In the structure of oils, a molecules of three fatty acids and one glycerol.  
 R : In the structure of oils only one Glycosidic bond.  
 (a) (b) (c) (d)
49. A: The subcutaneous fat layer under the skin, which maintains body temperature.  
 R : Lipid form an insulating layer.  
 (a) (b) (c) (d)
50. A: In plants food is stored as starch.  
 R : Starch is made up of amylase and amylopectin.  
 (a) (b) (c) (d)
51. A: In fish liver oil, glycerol is present as alcohol.  
 R : Glycerol are monohydroxy alcohol.  
 (a) (b) (c) (d)
52. Which of the following group is not organic group? [AIPMT 2010]  
 a) Fats, Proteins , Enzymes, Hormones.  
 b) Co-factors, Hormones, Water, Minerals.  
 c) Proteins, Carbohydrates, Nucleic acid, Hormones.  
 d) Proteins, Carbohydrates, Fats, Enzymes.
53. The middle Lamella is made up of..... [CBSE AIPMT 2009]  
 a) Muramic acid                      b) Calcium pectate  
 c) Phosphoglycerol                d) Hemicellulose.

54. The chemical formula of starch is..... [RPMT 2002]  
 a)  $(C_6H_{10}O_5)_n$                       b)  $(C_6H_{12}O_6)_n$   
 c)  $C_{12}H_{22}O_{11}$                       d)  $CH_3COOH$
55. Find out the wrongly matched pair [Kerala PMT 010]  
 a) Primary metabolite - Ribose.  
 b) Secondary metabolite - Insulin.  
 c) Protein - Insulin.  
 d) Cellulose - Heteropolymer.
- 56) Chitin is a..... [WB JEE 2010]  
 a) Polysaccharide  
 b) Nitrogenous polysaccharide  
 c) Lipoprotein  
 d) Protein
57. In a polysaccharide, the individual monosaccharides are linked by a..... [AMU (Med) 2011, Kerala PMT 2011]  
 a) Glycosidic bond  
 b) Peptide bond  
 c) Ester bond  
 d) Phosphodiester bond
59. Carbohydrates are commonly found as starch in plant storage organs which of the following five properties of starch make it useful as a storage material? [CBSE PMT 2008]  
 P. Easily transported.  
 Q. Chemically non reactive.  
 R. Easily digested by animals.  
 S. Osmotically inactive.  
 T. Synthesized during photosynthesis.  
 a) P, R and T                      b) P and T  
 c) Q and R                      d) Q and S
59. Match the items in column-I with items in column-II and the correct answer. [Kerala PMT 2006]
- | Column – I       | Column – II                            |
|------------------|--|
| P Triglyceride   | Animal hormones                        |
| Q Membrane lipid | ii Feathers and leaves                 |
| R Steroid        | iii Phospholipids                      |
| S Wax            | iv Fat stored in the form of droplets. |
- a) P iv Q iii R i S ii  
 b) P iv Q i R iii S ii  
 c) P iii Q iv R i S ii  
 d) P iv Q i R ii S iii



60. Find out the correct combination .... [GSEB 2011]  
 i) Triose sugar – Ribose.  
 ii) Starch – amylase and amylopectin  
 iii) Plasma membrane – phospholipid  
 iv) Melanin – sterols  
 v) Pituitary hormones – peptide.  
 a) Only ii, iii and iv  
 b) Only I, ii and iii  
 c) Only I and iii  
 d) Only ii, iii and v
61. Generally protein and carbohydrate components are found in cow milk... [KCET 2005]  
 a) Albumin, Lactose  
 b) Globulin, Casein  
 c) Casein, Lactose  
 d) Casein, Fructose
62. Starch and Cellulose are the compounds made up to many units of..... [CPMT 1988, 89, 93, 2009]  
 a) Simple sugar  
 b) Fatty acid  
 c) Glycerol  
 d) Amino acid
63. Which of the following is the characteristic of plants... [MP PMT 2003]  
 a) Glucose and Cellulose  
 b) Pyruvic acid and Glucose  
 c) Cellulose and Starch  
 d) Starch and Pyruvic acid
64. Most common monomer of Carbohydrate is..... [Orissa JEE 2008]  
 a) Glucose                      b) Fructose  
 c) Sucrose                      d) Maltose
65. Lipids are insoluble in water because lipid molecules are..... [CBSE PMT 2002]  
 a) Neutral                      b) Zwitter ions  
 c) Hydrophobic              d) Hydrophilic
66. Given below is the chemical formula is..... [Kerala PMT 2007]  

$$\begin{array}{c} \text{O} \\ || \\ \text{CH}_3(\text{CH}_2)_{14} - \text{C} - \text{OH} \end{array}$$
 a) Palmitic acid              b) Stearic acid  
 c) Glycerol                      d) Galactose

67. Given below chemical formula is..... [H PMT 2002]  
 $\text{CH}_3(\text{CH}_2)\text{CH} = \text{CH}(\text{CH}_2)_7\text{COOH}$   
 a)  $\alpha$  - ketoglutarate      b) Oxalosuccinet  
 b) Oleic acid                      d) Linolic acid.
68. Which of the following is not a disaccharide? [D PMT 2007]  
 a) Maltose    b)Starch    c) Sucrose    d)Lactose
69. The repeating unit of Glycogen is..... [WB JEE 209]  
 a) Fructose    b) Mannose    c) Glucose    d) Galactose
70. Maltose are insoluble in..... [PMT 2000]  
 a) Water      b) Alcohol    c) Acid      d) Basic
71. Which is an organic component found in most cells? [DPMT 2009]  
 a) Glucose    b) Lignin    c) Sodium chloride    Oxygen

### ANSWER KEY

1 D	16 A	31 B	46 A	61 C
2 C	17 B	32 C	47 B	62 A
3 A	18 B	33 D	48 C	63 C
4 B	19 D	34 B	49 A	64 A
5 C	20 B	35 C	50 B	65 B
6 D	21 B	36 B	51 C	66A
7 C	22 C	37 B	52 B	67 C
8 C	23 B	38 B	53 B	68 B
9 C	24 A	39 A	54 A	69 B
10 D	25 C	40 B	55 D	70 C
11 C	26 A	41 B	56 B	71 A
12 D	27 C	42 A	57 A	
13 B	28 A	43 C	58 D	
14 A	29 D	44 B	59 A	
15 D	30 B	45 A	60 D	



## Unit - III

### Chapter-12 Biomolecules - II

#### IMPORTANT POINTS

Proteins are important compound of cytoplasm. They consist of C, H, O, N and S. Proteins are soluble in water but keratin is insoluble in any solvent. The structural unit of protein is amino acid. They are linked with the help of peptide bond. There are 20 types of amino acids in living organisms. They possess an-NH<sub>2</sub> group, a-COOH group, an 'H' and a 'R' group. They differ from each other in the composition of their 'R' group. It is amphoteric in nature. Structurally proteins are classified into four types. All enzymes are made up of protein. When protein becomes associated with some materials other than amino acids they are known as conjugated proteins.

Nucleic acids consist of C, H, O, N and P. Each nucleotides is made up of a pentose sugar, nitrogen base and phosphoric acid. DNA & RNA are example of nucleic acids. Uracil is not in DNA and thymine is not in RNA. There are three types of RNS.

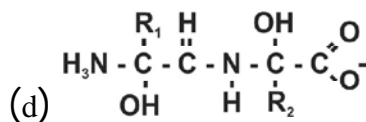
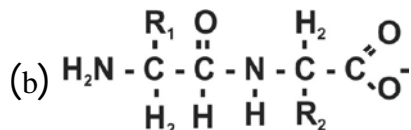
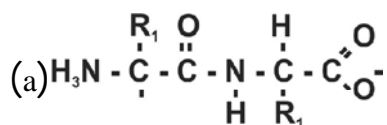
Specific chemicals which act as biological catalyts are called enzymes. Chemically enzymes are protein. Sometimes an enzyme is also poses a non protein part. In such type of enzyme protein part is known as apoenzyme and non protein part is called cofactor. Prosthetic group tightly bound with them and coenzyme are loosely bound with them. Enzymes are classified in to six categories on the basis of biochemical reactions catalyzed by them.

- (1) Which of the following cell organelle is stored the information of synthesize Proteins?
  - (a) Mitochondria (b) Nucleus (c) Chloroplast (d) Cell membrane
- (2) Which of following elements are stored the information of Proteins?
  - (a) Lipid (b) Polysaccharide (c) Amino acid (d) Nucleic acid
- (3) Find out the Miss matched pairs:
  - (a) Protein – important compounds of nucleus
  - (b) Nucleic acid – major components of chromosomes
  - (c) Amino acid – an amphoteric compound
  - (d) Enzymes – Colloidal catalyts
- (4) Which of the following are linked together to form Proteins ?
  - (a) Phosphate (b) Nitrogen base (c) Sugar (d) Amino acids
- (5) Which one of the following is incorrect for Protein:
  - (a) They transport some nutrients across cell membrane
  - (b) They are heteropolymer of amino acids

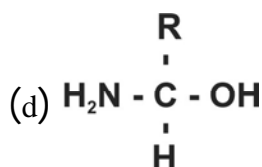
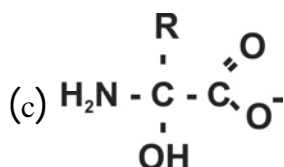
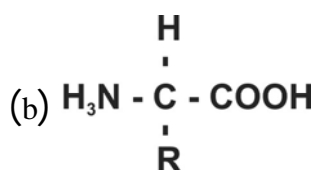
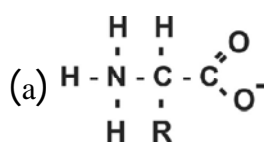
- (c) They possess C, H, O, N and P in their constitution  
 (d) They are very important compounds of cytoplasm
- (6) Total numbers of amino acids are involved in protein synthesis in Plants:  
 (a) 10                      (b) 22                      (c) 13                      (d) 20
- (7) Which one is the most abundant protein in the animal world?  
 (a) Collagen              (b) keratin              (c) RUBISCO              (d) Hemoglobin
- (8) Full form of RUBISCO is:  
 (a) Ribulose Bisulphate Carboxylase Oxygenare  
 (b) Ribuose Biphosphate Carboxylase Oxygenare  
 (c) Ribuose Bisulphate Carboxylase Oxygenare  
 (d) Ribulose Biphosphate Carboxylase Oxygenare
- (9) Match the items in column – I with appropriate items in column – II and pick up correct ans
- | <b>Column – I</b> |    | <b>Column – II</b>          |     |
|-------------------|----|-----------------------------|-----|
| (P) RUBISCO       |    | (i) contractile protein     |     |
| (Q) Keratin       |    | (ii) insoluble protein      |     |
| (R) Hemoglobin    |    | (iii) most abundant protein |     |
| (S) globular      |    | (iv) conjugated protein     |     |
| P                 | Q  | R                           | S   |
| (a) iii           | ii | iv                          | i   |
| (b) iii           | iv | ii                          | i   |
| (c) iv            | I  | iii                         | ii  |
| (d) I             | ii | iv                          | iii |
- (10) Polypeptide chain of amino acid is:  
 (a) Nucleic acid    (b) Glycogen              (c) Protein              (d) Cellulose
- (11) At high temperature proteins are:  
 (a) Destroyed              (b) inactive              (c) denatured              (d) a or b
- (12) The structure of protein can be destroyed by which rays  
 (a) Ultra violet rays              (b) Infra red rays    (c) Radio waves    (d) Micro waves
- (13) Amino acid is an amphoteric compound because:  
 (a) It contains an amino group and a carboxyl group  
 (b) It contains an amino group and a functional group  
 (c) It contains a functional group and a carboxyl group  
 (d) It contains one H and a-R group
- (14) The unique property of each amino acid is determined by its particular:  
 (a) –COOH group              (b) –NH<sub>2</sub> group              (c) –R group              (d) peptide bond
- (15) Which of the following is the most widely classification method of amino acid:  
 (a) Whittaker method              (b) Linnaeus method  
 (c) Ernest chain method              (d) Lehninger method

- (16) Which one is the correct group of amino acids with polar and negatively Charged –R group?  
 (a) Glutamate, Tyrosine (b) Arginine, Lysine  
 (c) Tryptophan, Proline (d) Glutamate, Aspartic acid
- (17) Find out the one group of amino acids which are related with each other:  
 (a) Valine, Histidine (b) Serine, Tyrosine  
 (c) Glutamate, Proline (d) Lysine, Laucine
- (18) Aspartic acid and lysine are linkage each other with which bond:  
 (a) Ester bond (b) Glycoside bond  
 (c) Phosphodiaster bond (d) Peptide bond
- (19) Match column – I and column –II and select the correct option:
- | Column – I        | column – II                                  |
|-------------------|--|
| (P) Arginine      | (i) polar and negatively changed ‘R’ group   |
| (Q) Glassine      | (ii) non polar ‘R’ group                     |
| (R) Methionine    | (iii) polar and positively changed ‘R’ group |
| (S) Aspartic acid | (iv) polar and ‘R’ group                     |
- |     | P   | Q  | R  | S   |
|-----|-----|----|----|-----|
| (a) | iii | iv | ii | i   |
| (b) | ii  | I  | iv | iii |
| (c) | I   | iv | ii | iii |
| (d) | iii | ii | iv | i   |
- (20) Amino acids are attached each other with which bond?  
 (a) Ester bonds (b) Hydrogen bonds  
 (c) Sulphur bonds (d) peptide bonds
- (21) Dipeptide means:  
 (a) Two similar amino acids attached by peptide bond  
 (b) Two dissimilar amino acids attached by peptide bond  
 (c) Two similar or dissimilar amino acids attached by peptide bond  
 (d) Two similar or dissimilar proteins attached by peptide bond
- (22) Which macromolecule is the most diverse in cell and controlling biochemical Properties?  
 (a) Polynucleotide (b) Polysaccharide  
 (c) Polypeptide (d) polysomes
- (23) The primary structure of proteins is due to  
 (a) Ionic bonds (b) Peptide bonds (c) Hydrogen bond (d) S-S Linkages
- (24) Proteins means  
 (a) Micromolecule (b) Macromolecule (c) Soluble (d) Colloidal
- (25) The structure of protein can be denatured by  
 (a) At high temperature (b) In dilute solution of acid  
 (c) In the presence of CO<sub>2</sub> (d) a, b, c all

(26) Which of the following is Dipeptide?



(27) Which of the following is an amino acid?



(28) Polypeptide means:

- (a) A polypeptide chain is formed by more than two nucleotides
- (b) A polypeptide chains is formed by more than two amino acids
- (c) A polypeptide chains is formed by many similar amino acids
- (d) A polypeptide chain is formed by many similar nucleotides

(29) Which biomolecular fights against infectious organisms?

- (a) Lipid
- (b) Nucleic acid
- (c) Protein
- (d) Enzyme

(30) Which one of the following is an amphoteric compound?

- (a) Fatty acid
- (b) Glutamic acid
- (c) Nucleic acid
- (d) Cellulose

(31) Proteins Consist which one of the following

- (a) One polypeptide
- (b) One polypeptide chain
- (c) One or more polypeptide chain
- (d) One  $\alpha$  and other  $\beta$ - chain

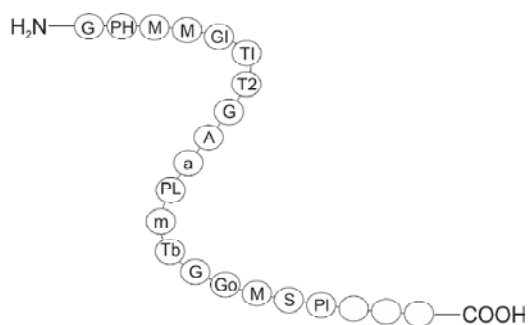
(32) Which one of the following statement about amino acid is incorrect?

- (a) They are classified on the basis of the 'R' group
- (b) The structure of almost all amino acids are similar except their 'R' group
- (c) All protein molecules are a heteropolymer of amino acid
- (d) They are very important compounds of cytoplasm

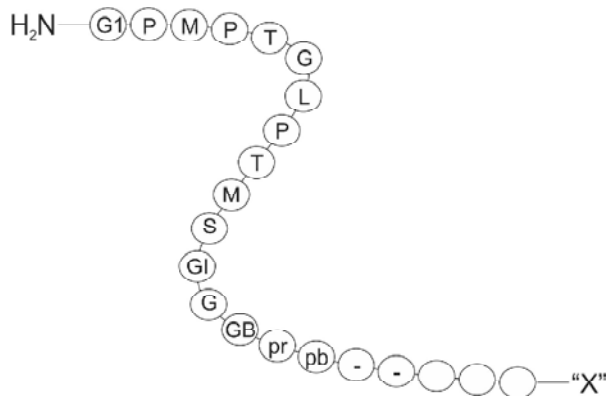
(33) Which of the following process is formed by  $-\text{COOH}$  linked to  $-\text{NH}_2$  (peptide bond)

- (a) Hydrogenation
- (b) Dehydrogenation
- (c) Reduction
- (d) Oxidation

- (34) End of every polypeptide chain is known as:  
 (a) Template                      (b) Signal                      (c) Antenna                      (d) Terminal
- (35) Which are the terminals of polypeptide chain?  
 (a) 'R' and 'N' terminal                      (b) 'P' and 'R' terminal  
 (c) 'H' and 'N' terminal                      (d) 'N' and 'C' terminal
- (36) The secondary structure of protein means  
 (a) The flat and sheet like polypeptide chain  
 (b) The helically coiled like polypeptide chain  
 (c) The folding of polypeptide chain due to the presence of hydrogen bond  
 (d) a, b, c all
- (37) Which of the following is correct for the quaternary structure of protein?  
 (a) It represents a three dimensional form of whole protein  
 (b) It forms with interaction between different polypeptide Chain.  
 (c) a and b both  
 (d) It forms the three dimensional arrangement of the atoms within a single polypeptide chain
- (38) Which is the correct option for the following diagram?

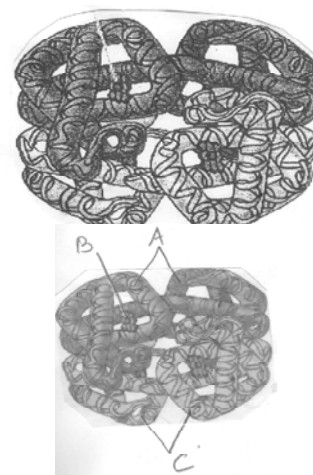


- (a) Fibrous protein                      (b) Globular protein  
 (c) Polypeptide chain                      (d) Three dimensional form of protein
- (39) What –'X' indicates in the given figure?



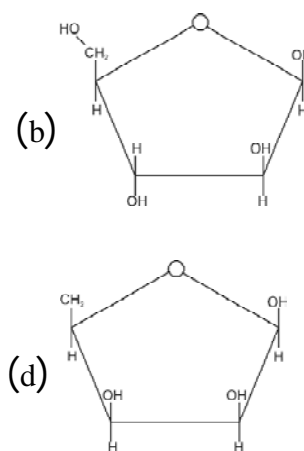
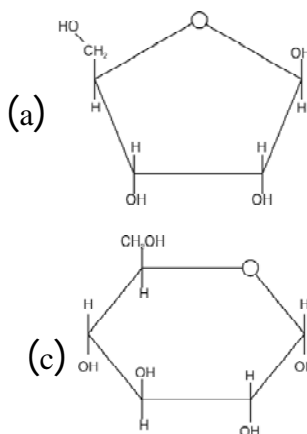
- (a) N-terminal                      (b) P-terminal  
 (c) C-terminal                      (d) H-terminal

- (40) What is the shape of the three dimensional structure of protein?  
 (a) Flat sheet like      (b) Globular      (c) Fibrous      (d) b or c
- (41) Which of the following bond groups are involved in the formation of quaternary Protein?  
 (a) Peptide bond, covalent bond      (b) Disulphide bond, Ionic bond  
 (c) Ester bond, phosphodiester bond      (d) b and c both
- (42) Which one is not correct for hemoglobin?  
 (a) It is known as conjugated protein  
 (b) It is the combination of 2- $\alpha$  and 2- $\beta$  chain  
 (c) It is a protein which imparts color to the body  
 (d) It is molecule which contains four hame groups.
- (43) Find out the miss matched pair  
 (a) Melanin-imparts color to the body  
 (b) Hemoglobin – transport of oxygen  
 (c) Chlorophyll – must for photosynthesis  
 (d) Immunoglobulin- responsible for movements of body
- (44) Which of the following statement is incorrect about Immunoglobulin?  
 (a) It has the property of immunity  
 (b) It consist of more than one polypeptide chain  
 (c) It present in blood cell  
 (d) b and c both
- (45) What does the following diagram show?  
 (a) Quaternary structure of protein  
 (b) polypeptide chain  
 (c) Molecule structure of protein  
 (d) Secondary structure of protein
- (46) Give the correct names of A, B and C shown in the figure  
 (a) A= Haem group, B= $\alpha$  - chain C= $\beta$ -chain  
 (b) A= $\beta$  chain, B= Hame group C=  $\alpha$  -chain  
 (c) A= S-S bond, B=Haem group C= peptide chain  
 (d) A=  $\alpha$  - chain, B=S-S bonds C= $\beta$ -chain
- (47) The classification of the protein in two types depends on  
 (a) Structure and function      (b) Types of amino acid  
 (c) Numbers of amino acid      (d) none above
- (48) Which one molecule is finding a Weakly acidic substrate of unknown function in The nuclei of human WBC ?  
 (a) Nucleic acid      (b) nuclein      (c) Protein      (d) Chromosome
- (49) Nuclein separated in to which components?  
 (a) Protein + chromosome      (b) Protein + Nucleic acid  
 (c) Nucleic acid + nitrogen base      (d) Nuceicoside + Nucleotide

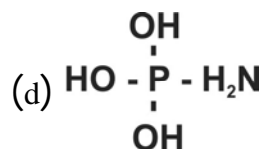
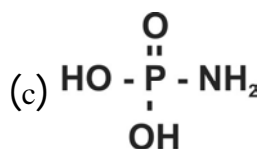
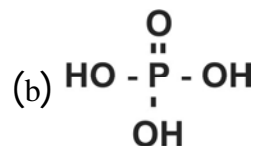
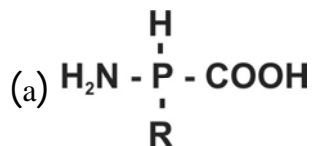




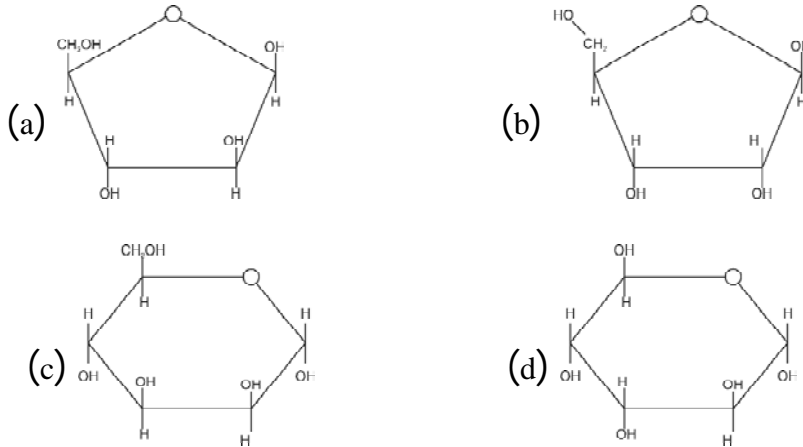
- (50) Which one of the following is the major component of chromosome?  
 (a) Nucleic acid            (b) Protein            (c) Nitrogen base            (d) Lipid
- (51) Nucleic acid contains which group of molecules in their constitution?  
 (a) C, H, N and S                                  (b) C, H, O, N and S  
 (c) C, H, N, O, and P                          (d) C, H, N and O
- (52) Nucleic acids means  
 (a) A major components of chromosomes  
 (b) Polynucleotide of structural units known as nucleotides  
 (c) Small gene carrying bodies in the nuclei of complex cells  
 (d) Both a & b
- (53) Which are the structural units of DNA?  
 (a) Nitrogen base            (b) Pentose sugar  
 (c) nucleotide                                  (d) phosphoric acid
- (54) Which one group is the subunit of nucleotide?  
 (a) Pentose sugar, nitrogen  
 (b) Purina, pyrimidine, phosphorus  
 (c) Nitrogen base, sugar  
 (d) pentose sugar, Nitrogen base , phosphoric acid
- (55) Which of the following structure is correct for ribose sugar?



- (56) Which one is the correct structure of phosphoric acid?



(57) Which of the following is correct for deoxyribose sugar?



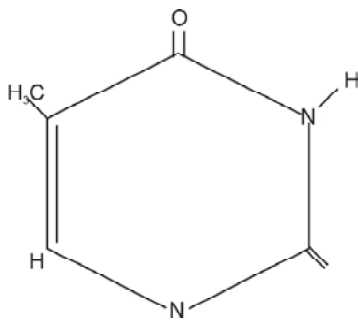
(58) Which of the following will be characteristically different in different living organism?

- (a) Protein            (b) Nucleic acid  
(c) Enzyme            (d) Carbohydrate

(59) Which one is not a polymer?

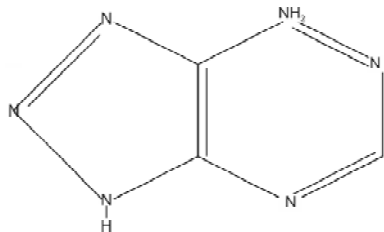
- (a) ATP                (b) Hemoglobin  
(c) Nucleotide        (d) Enzyme

(60) The illustration given below is which nitrogen base:



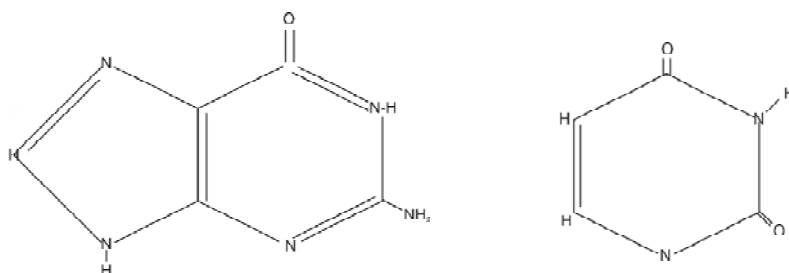
- (a) Uracil                (b) Cytosine  
(c) Thymine            (d) Ribose

(61) The illustration given below is which nitrogen base:

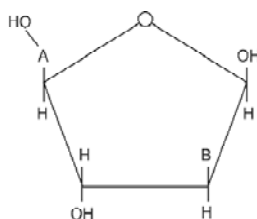


- (a) Guanine            (b) Cytosine            (c) Uracil                (d) Adenine

- (62) The following diagram represents the nitrogenous bases of nucleic acid Molecules Identify the correct combination:

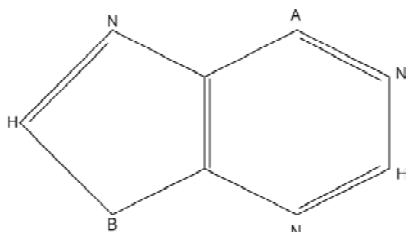


- (a) A= Guanine , B= Uracil  
 (b) A= Adenine , B= Thymine  
 (c) A= Cytosine , B= Adenine  
 (d) A= thymine , B= Guanine
- (63) What is Ribonucleoside?  
 (a) Ribose + Nucleic acid  
 (b) Ribose + Nitrogen base  
 (c) Ribose + Phosphate  
 (d) Ribose + Adenine
- (64) What 'A' and 'B' indicates in the given diagram?

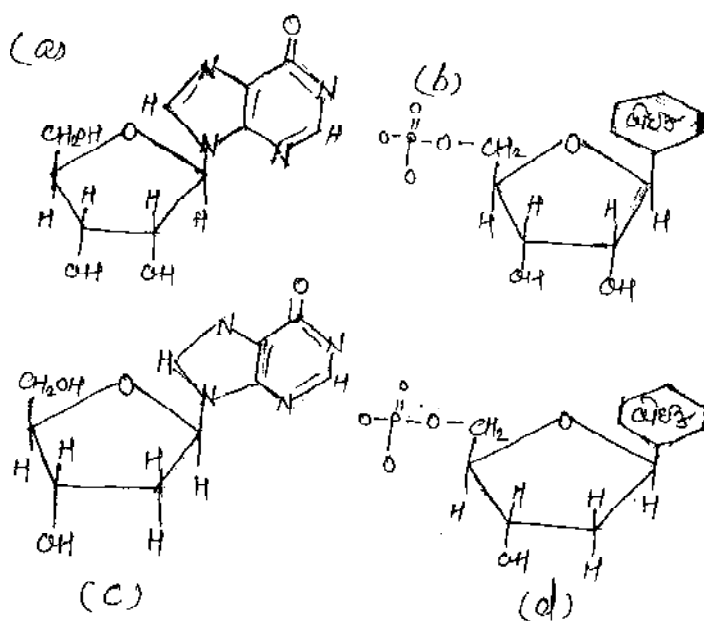


- (a) A= CH<sub>2</sub>OH, B= OH  
 (b) A= CH<sub>2</sub>OH, B= H  
 (c) A= CH, B= OH  
 (d) CH<sub>2</sub>, B= H
- (65) Which two sequential carbon number of nucleotides join through phosphodiester bond?  
 (a) 3 and 5  
 (b) 1 and 4  
 (c) 1 and 6  
 (d) 2 and 5
- (66) What is Guanine?  
 (a) Purine  
 (b) Hormone  
 (c) Enzyme  
 (d) Pyrimidine
- (67) Ribonucleoside formed from ribonucleotide while:-  
 (a) It made from sugar  
 (b) It made from nitrogen base  
 (c) It made from phosphate  
 (d) a, b, c all above
- (68) DNA is localized in which cell organelle?  
 (a) Vacuoles  
 (b) Lysosomes  
 (c) Golgi apparatus  
 (d) Nucleus, mitochondria, chloroplast
- (69) A DNA stand is directly involved in the synthesis of all the following except –  
 (a) Another DNA Stand (b) t- RNA (c) m-RNA (d) Protein
- (70) Nucleic acids were discovered by whom?  
 (a) Crick (b) Wilkinson (c) meischer (d) Watson

- (71) Nucleic acids are related with which activity?  
 (a) Digestion (b) Respiration (c) Reproduction (d) Heredity
- (72) What 'A' and 'B' indicates in the given structure?

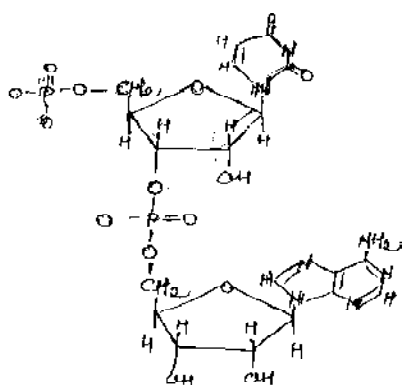


- (a) A =  $\text{CH}_2$ , B = N  
 (b) A =  $(>\text{C}=\text{O})$ , B = NH  
 (c) A = NH, B = NH  
 (d) A =  $\text{NH}_2$ , B = NH
- (73) Which of the following is deoxyriboside?



- (74) Chemically DNA differs from RNA by:  
 (a) Thymine and deoxyribose present in DNA and Uracil and ribose in RNA  
 (b) Uracil and deoxyribose in DNA and thymine and ribose in RNA  
 (c) Deoxyribose in DNA and ribose in RNA  
 (d) Two nucleotide in DNA and one nucleotide in RNA
- (75) Nucleic acids are polymers of which molecules?  
 (a) Nucleosides (b) Nucleotides (c) Polypeptides (d) polysomes
- (76) A molecule of ATP is structurally most similar to a molecule of?  
 (a) RNA (b) Protein (c) Lipid (d) Amino acid

- (77) Which is the site of protein synthesis?  
 (a) Chromosomes (b) DNA (c) Polysomes (d) Tonoplast
- (78) Select the specific base pairs of DNA:  
 (a) Adenine and Cytosine (b) Guanine and Adenine  
 (c) Adenine and Thymine (d) Guanine and Uracil
- (79) The DNA strands are antiparallel because of:  
 (a) Ester bond (b) Phosphodiester bond  
 (c) Disulphide bond (d) Hydrogen bond
- (80) The distance between two chains of DNA molecules is:  
 (a) 34 Å (b) 20 Å (c) 3.4 Å (d) 10 Å
- (81) The length of one complete spiral of DNA is:  
 (a) 34 Å (b) 3.4 Å (c) 20 Å (d) 340 Å
- (82) Which one of the following bases is found only in RNA and not in DNA?  
 (a) Guanine (b) Adenine (c) Uracil (d) Thymine
- (83) The scientists who discovered the structure of DNA molecule  
 (a) Miller and Mandel (b) Khorana and Nirenberg  
 (c) Calvin and Wilkinson (d) Watson and Crick
- (84) Mention the example of dinucleotide in the given structure.



- (a) RNA with UA  
 (b) RNA with CG  
 (c) DNA with TA  
 (d) DNA with CG
- (85) The structure of DNA like a spiral ladder because  
 (a) Purine and Pyrimidine are on the opposite side  
 (b) Purine and Pyrimidine linked with hydrogen bond  
 (c) All nucleotides join through a phosphodiester bond  
 (d) Two polynucleotide chains arranged parallel to each other and are spirally Twisted
- (86) The hydrogen bonds between adenine and guanine are  
 (a) 2 (b) 3 (c) 1 (d) 0

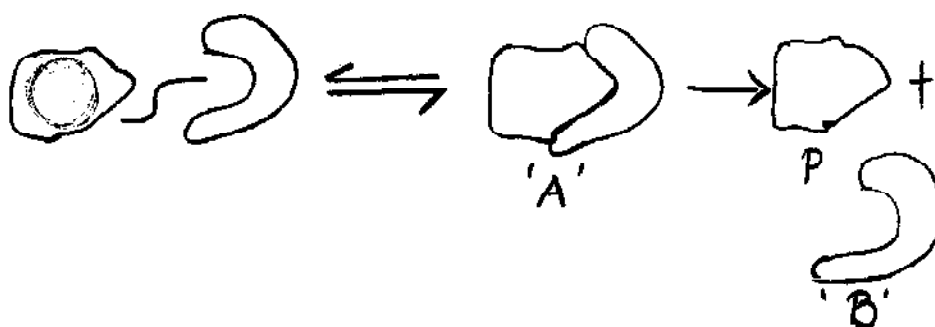
- (87) Which of the following is correct?  
 (a) A=T            (b) C=G            (c) G=A            (d) A=C
- (88) Nitrogen bases do not contain  
 (a) Phosphorus    (b) Nitrogen        (c) Hydrogen        (d) Carbon
- (89) Which one is two ringed nitrogenous base?  
 (a) Thymine        (b) Adenine        (c) Cytosine        (d) Uracil
- (90) Which of the following ratio is constant in the DNA of all the species?  
 (a) A+U / T+C    (b) A+G/ C+T    (c) A+C / T+G    (d) A+T / C+G
- (91) m-RNA is the polymer of  
 (a) Ribonucleotide                      (b) Ribonucleoside  
 (c) Deoxyribonucleotide                (d) Ribosome
- (92) Which of the following is incorrect?  
 (a) m-RNA is degraded after its function is over  
 (b) t-RNA are synthesized by m-RNA  
 (c) r-RNA is localized in the ribosome  
 (d) m-RNA carries genetic code in to cytoplasm
- (93) Which is longest of all RNA?  
 (a) m-RNA        (b) t-RNA        (c) r-RNA        (d) None above
- (94) The common instant source of energy of cellular activities is  
 (a) Mitochondria    (b) DNA            (c) RNA            (d) ATP
- (95) Which one is known as adapter molecule?  
 (a) DNA            (b) m-RNA        (c) t-RNA        (d) r-RNA
- (96) The RNA transporting amino acid to the protein synthesizing site known as  
 (a) t-RNA            (b) r-RNA            (c) m-RNA        (d) Any one of a, b, c
- (97) Match the column and find out the correct combination
- | <b>Column –I</b> | <b>Column –II</b>    |
|------------------|----------------------|
| (P) Keratin      | (i) co-enzyme        |
| (Q) ATP          | (ii) pyrimidine      |
| (R) Cytosine     | (iii) polynucleotide |
| (S) NAD          | (iv) Purine          |
| (T) Guanine      | (v) polypeptide      |
- (a) P-v, Q-iii, R-ii, S-i, T-iv                      (b) P-v, Q-iii, R-iv, S-I, T-ii  
 (c) P-iii, Q-v, R-i, S- ii, T-iv                      (d) P-v, Q-i, R-ii, S-iii, T-iv
- (98) Which is the special function of t-RNA?  
 (a) Pick up code for m-RNA and bring it to r-RNA  
 (b) Do protein synthesis  
 (c) Carries the coded genetic information in to the cytoplasm  
 (d) An adapter for attaching amino acid to m-RNA template during Protein synthesis

- (99) Which are proportionally more compounds in all RNA's?  
 (a) m-RNA      (b) t-RNA      (c) r-RNA      (d) a, b, c all
- (100) Which is the part of DNA molecules that varies among DNA molecule  
 (a) Pentose sugar   (b) nitrogen base   (c) phosphate      (d) a & b both
- (101) which kind of arrangement lies in the two polynucleotide chain of DNA?  
 (a) Antiparallel and complementary      (b) parallel and complementary  
 (c) Independent      (d) None above
- (102) If the one base chain sequence of DNA is ACGTTGG then what will be the base Sequence of opposite chain  
 (a) TGCAACC      (b) GTAGGAA  
 (c) CATGGTT      (d) TAGCCGG
- (103) What is ATP?  
 (a) Pentose sugar + adenine + 3 molecule phosphate  
 (b) Hexose sugar + adenine + 3 molecule phosphate  
 (c) Amino acid + adenine + 3 molecule phosphate  
 (d) a or b both
- (104) What is enzyme?  
 (a) All proteins which are in all living cell  
 (b) Chemicals which act as biological catalysts  
 (c) All amino acid which are in polypeptide chain  
 (d) All above
- (105) Which of the following is not true for enzyme  
 (a) Water soluble and colloidal in nature  
 (b) Lowers the activation energy level  
 (c) Used up in the biochemical reaction  
 (d) Affected by the change in temperature
- (106) What is Ribozymes?  
 (a) Only nucleic acids  
 (b) ony protein  
 (c) Some nucleic acids that behave like enzyme  
 (d) More than one Ribosome
- (107) Enzymes are present in which parts of plant?  
 (a) Only in leaves      (b) Only in fruits  
 (c) In apical meristem of root and shoot      (d) in all the living cell of plant body
- (108) What is an apoenzyme?  
 (a) Protein      (b) Amino acid      (c) metallic ions      (d) Carbohydrates
- (109) What is co – enzyme?  
 (a) Always a protein      (b) always a amino acid  
 (c) Often a vitamin      (d) Often a protein

- (110) Find out the correct function of co-enzyme?  
 (a) In association with apoenzyme and make it effective  
 (b) Independently of the apoenzyme  
 (c) In association with any protein and make it effective  
 (d) None above
- (111) Which one property is not true for enzyme?  
 (a) It effective for one reaction is not useful in another reaction  
 (b) It is amphoteric in nature  
 (c) All enzymes are bidirectional  
 (d) They are not destroyed
- (112) The rate of most of enzyme catalyzed reaction changes with PH as the PH Increases this rate?  
 (a) Reaches a maximum (b) Reaches a minimum  
 (c) Decreases (d) Increases
- (113) Near freezing point an enzyme is  
 (a) Slightly activated (b) Inactivated  
 (c) Denatured (d) Destroyed
- (114) A temperature change from 30° C to 50° C the rate of enzyme actively will:  
 (a) Increase (b) Decrease  
 (c) First increase and then decrease (d) First decrease and then increase
- (115) An enzyme brings about  
 (a) Activation energy level (b) Increase in reaction time  
 (c) Decrease in activation energy level (d) all above
- (116) Enzymes are polymers of:  
 (a) Fatty acid (b) Phosphate (c) Amino acid (d) Nucleotides
- (117) Which one is not correct for enzyme?  
 (a) They all are biocatalysts (b) They all are colloidal  
 (c) They all are proteins (d) All proteins are enzymes
- (118) Inorganic catalyst recognized what when it attached an enzyme?  
 (a) Activator (b) Co- enzyme (c) Inhibitor (d) Apoenzyme
- (119) At which place the substrate combines with the enzymes:  
 (a) Active site (b) inactive site (c) Common site (d) Gap site
- (120) Fill it  $E + S \rightarrow$  \_\_\_\_\_  
 (a) E-S (b) E-S complex (c) product (d) enzyme
- (121) Enzyme and substrate complementary each other such as  
 (a) Pencil & eraser (b) Pen & Paper (c) Lock & key (d) all above
- (122) Which one of the following chemical is classified as an enzyme?  
 (a) Try glyceride (b) Cellulose (c) Galactose (d) Sucrase
- (123) In the cell digestive enzymes are mostly in which cell organells?  
 (a) Ribosome (b) vacuoles (c) Lysosomes (d) Mitochondria



- (124) Enzymes are named after their substrate adding suffix –  
 (a) — In            (b) — ase            (c) — ose            (d) — on
- (125) The enzyme which removes hydrogen from the substrate is known as:  
 (a) Oxido-reductase            (b) Dehydrogenase  
 (c) Hydrogenase            (d) Hydrolyses
- (126) The product is realized from which site of the enzyme?  
 (a) Simple site    (b) active site    (c) Complex site    (d) Inactive site
- (127) What 'A' and 'B' indicates in the given figure (reaction)?



- (a) A= ES complex    B=S            (b) A=S    B=E  
 (c) A= ES complex    B=E            (d) A= EP complex, B=E
- (128) which of the following enzyme would correct glucose in to glucose-6-phosphate  
 (a) Hydrolyses            (b) Lyases            (c) Isomerases    (d) Trans ferase
- (129)  $\text{Glucose} + \text{ATP} \rightarrow \text{glucose} - 6\text{-phosphate} + \text{ADP}$  which enzyme occur this reaction?  
 (a) Glucose isomerase            (b) Glucose oxidase  
 (c) Glucose dehydrogenase            (d) Hexokinase
- (130) which enzyme would change glucose – 6 phosphate to fructose – 6 phosphate?  
 (a) Transferase            (b) Isomerase    (c) Lyases            (d) glucose phosphatase
- (131) which enzyme involved in hydrolysis of maltose to glucose?  
 (a) Synthetase            (b) maltase            (c) Galactose            (d) Lyases
- (132) the enzyme which also known as scissor?  
 (a) Lyases            (b) Ligarer            (c) Isomerases            (d) Trans ferases
- (133) which enzyme involved in conversion of a molecular in to an isomer?  
 (a) Lyases            (b) Synthetase            (c) Isomerase            (d) Transferase
- (134) The enzyme which break up fructose 1, 6 biphosphate in to fructose phosphates known?  
 (a) Aldolase            (b) Phosphatase  
 (c) Fructose phosphase            (d) Fructose
- (135) Which enzyme is needed to digest food reserve in pea seeds?  
 (a) Lipase            (b) Nuclease            (c) Proteases            (d) Amylase
- (136) The best example of extra cellular enzyme is?  
 (a) Nuclease            (b) Digestive enzyme            (c) Dehydrogenase            (d) Lipase

- (137) A non-protein component of enzyme is called?  
 (a) Co-factor                      (b) Activator                      (c) Co-enzyme                      (d) Inhibitor
- (138) Which is an enzyme that joins acetic acid to Co A with the help of energy?  
 (a) Acetic acid co. A Synthetase                      (b) Ligases  
 (c) Acetyl co. A Synthetase                      (d) No one
- (139) Carbonic anhydrase is activated in the presence of which elements?  
 (a) Mb                      (b) Mn                      (c) Ca                      (d) Zn
- (140) Vanadium is necessary for the activation of which enzyme?  
 (a) Kinase                      (b) Maltase                      (c) Nitrogenase                      (d) Enolase
- (141) Find out the correct group of co. factor which is activated enolase?  
 (a) Mg, Co, Ca                      (b) Mg, Mn, Zn                      (c) Co, Ca, V                      (d) Mn, Zn, V
- (142) Which one is not a co. Enzyme?  
 (a) NAD                      (b) NADP                      (c) FAD                      (d) ADP
- (143) Find out the correct group of enzyme which is activated by calcium?  
 (a) Nitric oxide Synthetase, protein phosphatase , adenykinase  
 (b) Acetyl co. A Synthetase, fructose isomerase protein phosphatase  
 (c) Succinic dehydrogenase, Cytochrome oxidase, Aldolase  
 (d) All above
- (144) Which of the following sets is not co enzyme?  
 (a) NAD, FAD, ATP                      (b) NAD, NHDP, FMN  
 (c) Fe, Cu, Zn                      (d) V, Ca, Mg
- (145) Co enzyme differs from prosthetic group because:-  
 (a) They deactivates the enzymes  
 (b) They do not attached with apoenzyme  
 (c) They attached apoenzyme with loosely bound  
 (d) They activates the enzymes
- (146) Maltose is composed in which form  
 (a) Glucose + galactoge                      (b) Glucose + fructose  
 (b) Glucose + Glucose                      (d) Glucose + Ribose
- (147) S: protein carry out many functions in living organisms  
 A: all enzymes are made up of proteins  
 R: they are responsible for maintenance of proper rates of biochemical reaction in cell  
 (A) S&A are true but R is false  
 (B) S,A&R are true and R&A are the correct explanation of S

(C) S is true but A&R both are false

(D) S, A&R are true but R&A are not the correct explanation of S

**The following options are given for question no 148 to 152.**

(a) Both A&R are true and R is the correct explanation of A

(b) Both A&R are true but R is not the correct explanation of A

(c) A true R false

(d) both A & R are false

(a) (b) (c) (d)

(148) A: peptide bond is formed between the

–COOH group of one amino acid and

–NH<sub>2</sub> group of another amino acid molecule

R: a molecule of H<sub>2</sub>O is added in this process.

(a) (b) (c) (d)

(149) A: some protein transport nutrients across all membrane

R: the variation in the different species of living organisms is due to the variation in their bimolecular

(a) (b) (c) (d)

(150) A: Dipeptide is formed through the union of two similar or dissimilar aminoacid molecule

R: Dipeptide bond is formed between the

–COOH group of one amino acid and

–NH<sub>2</sub> group of another amino acid molecule

(a) (b) (c) (d)

(151) A: Conjugated protein are responsible for movements

R: Protein become associated with other than amino acids are known as Conjugated protein

(a) (b) (c) (d)

(152) A: Each enzyme has an effect on a particular reaction

R: Glucose and galactose is the product of hydrolysis of lactose in presence of The lactose

(a) (b) (c) (d)

(153) Protein conjugated to carbohydrate is [CBSE 2000]

(a) Lecithoprotein (b) Glycoprotein (c) Lipoprotein (d) Metalloprotein

(154) DNA nucleotides are attached with [A.F.M.C.2001]

(a) Hydrogen bonds (b) covalent bonds

(c) Vander Waal's force (d) Electrovalent bonds

- (155) Most abundant organic compound on earth is [C.B.S.E.2001]  
[karnataka- 2000]  
(a) Protein (b) Cellulose (c) Lipid (d) Steroid
- (156) Which one is a simple protein? [Kerala 2004]  
(a) Albumin (b) Nucleoprotein (c) Lipoprotein (d) Glycoprotein
- (157) Bond formed between the first phosphate group and adenosine in ATP is  
(a) Nitrophosphate bond (b) Adenophosphate bond  
(c) Phosphoanhydride bond (d) Phosphoester bond
- (158) Nucleotides are building blocks of nucleic acids each nucleotide is a composite Molecule formed by [C.B.S.C. 2005]  
(a) (base-sugar-phosphate)<sub>n</sub> (b) base-sugar-OH  
(c) base-sugar-phosphate (d) sugar-phosphate
- (159) Which one is not a nucleotide? [AFMC 1998]  
(a) Adenine (b) Guanine (c) Thymine (d) Lysine
- (160) Which one is a molecule of ATP? [C.B.S.C. PMT 2000]  
(a) Nucleosome (b) Nucleoside (c) nucleotide (d) deoxyribose
- (161) t-RNA is a polymer of: [MP PMT 1997]  
(a) Deoxyribonucleoside (b) ribonucleoside  
(c) Ribonucleotide (d) deoxyribotide
- (162) Which one is Purine base of RNA? [C.B.S.E. PMT 1996]  
(a) Guanine (b) Thymine (c) Uracil (d) Cytosine
- (163) Enzymes are formed by conjunction of which molecule? [AFMC 1994]  
(a) Fatty acid (b) glucose (c) amino acid (d) carbon
- (164) Co-enzyme means [B.H.U. 1997]  
(a) Metal (b) Vitamin (c) Inorganic compound (d) a & c both
- (165) Enzymes in boiling water [CPMT1995]  
(a) Destroyed (b) Denatured  
(c) Uneffective (d) Inactive
- (166) Which one is the contractile protein [CBSE.PMT 1998]  
(a) Collagen (b) globular  
(c) tropomyosin (d) keratin
- (167) How many nucleotide present in DNA molecule which consist pair of 2000 N<sub>2</sub> base? [MP.PMT 1994]  
(a) 2,000 (b) 5,000 (c) 10,000 (d) 40,000

- (168) Which one is not gain by the hydrolysis of nucleoside? [DPMT 1996]  
 (a) Purine (b) Pentose sugar  
 (c) Phosphoric acid (d) Pyrimidine
- (169) Enzyme by natured: [CET chd 1998]  
 (a) vitamin (b) carbohydrate (c) polypeptide (d) Fatty acid
- (170) The pair of nitrogen base in DNA is conjugated with [PB PMT 1997]  
 (a) Disulphide bond (b) Hydrogen bond  
 (c) Peptide bond (d) Glycosidic bond
- (171) The prosthetic group which is in the structure of enzyme [Manipal PMT 1997]  
 (a) Loosely combining  
 (b) tightly binding  
 (c) It contain organic or inorganic structure  
 (d) only inorganic
- (172) Enzyme speed up rate of reaction by [C.B.S.E. 2000]  
 (a) Combining with product (b) Forming reaction product complex  
 (c) Changing equilibrium of reaction (d) Covering activation energy
- (173) The catalytic efficiency of two different enzymes can be compared by the  
 (a) The  $K_m$  value (b) The PH qutimum value  
 (c) Formation of the product (d) Molecular size of the enzyme
- (174) Which of the following cell organelles is rich in catabolic enzyme [PMT 2007]  
 (a) Ribosome (b) chloroplast (c) Mitochondria (d) Golgicomplex
- (175) Enzyme which help in electron transfer are: [B.H.U. 1998]  
 (a) Cytochrome (b) Isomerase (c) Protease (d) All of above
- (176) The enzyme which fixes  $CO_2$  in  $C_4$  plant is [C.B.S.E. 2000]  
 (a) Hydrogenase (b) PEP carboxyl ase  
 (c) Reductase (d) RuBp carboxylase
- (177) Enzyme involved in hydrolysis of starch to maltose is called: [PMT 1999]  
 (a) Sucrase (b) Amylase (c) Lactase (d) Maltase

**ANSWER KEY**

1	b	37	c	73	c	109	c	145	c
2	d	38	c	74	a	110	a	146	c
3	a	39	c	75	b	111	c	147	b
4	d	40	d	76	a	112	a	148	c
5	c	41	b	77	c	113	b	149	b
6	d	42	c	78	c	114	c	150	c
7	a	43	d	79	b	115	c	151	d
8	d	44	c	80	b	116	c	152	a
9	a	45	b	81	a	117	d	153	b
10	c	46	b	82	c	118	a	154	b
11	d	47	a	83	d	119	a	155	a
12	a	48	a	84	a	120	b	156	a
13	a	49	b	85	d	121	c	157	d
14	c	50	a	86	d	122	d	158	c
15	d	51	c	87	a	123	c	159	d
16	d	52	d	88	a	124	b	160	c
17	b	53	c	89	b	125	b	161	c
18	d	54	d	90	d	126	b	162	a
19	a	55	a	91	a	127	c	163	c
20	d	56	b	92	b	128	d	164	b
21	c	57	a	93	a	129	d	165	b
22	c	58	b	94	d	130	b	166	d
23	b	59	c	95	c	131	b	167	c
24	b	60	c	96	a	132	a	168	c
25	a	61	d	97	a	133	c	169	c
26	a	62	a	98	d	134	a	170	b
27	a	63	b	99	c	135	c	171	c
28	b	64	d	100	b	136	b	172	d
29	c	65	a	101	a	137	a	173	a
30	b	66	a	102	a	138	c	174	c
31	c	67	c	103	a	139	d	175	a
32	d	68	d	104	b	140	c	176	b
33	b	69	d	105	c	141	b	177	b
34	d	70	c	106	c	142	d		
35	d	71	d	107	d	143	a		
36	d	72	d	108	a	144	a		



## Unit - III

### Chapter-13. CELL CYCLE AND CELL DIVISIONS

#### IMPORTANT POINTS

The cell cycle is the series of events that takes place inside a cell thus leading to cell division and cell duplication. The cell cycle is divided into two brief stages : (A) Interphase – during which the cell grows and accumulates nutrients needed for mitosis and DNA material duplicates in this stage It is further divided into  $G_1$ , S and  $G_2$  (B) Mitosis (M) phase – during which the cell divides itself into two distinct cells, called “daughter cells”. Mitosis is also divided into four stages viz. prophase, metaphase, anaphase and telophase. During prophase condensation of chromosomes takes place. Metaphase can be indicated by arrangement of chromosomes at the equatorial plate. During anaphase centromeres divide and chromatids start moving towards the opposite poles. Each chromatid behaves like an individual chromosome during telophase. Nuclear membrane appeared and two nuclei are formed. Nuclear division (karyokinesis) is followed by cytoplasmic division and is called cytokinesis.

There are two stages of meiosis, namely, meiosis I and meiosis-II. Meiosis – I is called reduction division or heterotypic division while meiosis – II is called homotypic division.

The parent cell or the dividing cell undergoes a preparatory phase, known as interphase, before entering the two stages of meiosis. Meiosis – I and II consist four common phases viz. prophase, metaphase, anaphase and telophase. The prophase of meiosis – I is a long phase which is further divide into five phases. These are leptotene, zygotene, pachytene, diplotene, and diakinesis. Due to formation of bivalent spindle the chromosomes which are arranged at the equatorial plate during metaphase are pulled towards the opposite poles during anaphase. Each pole receives half the chromosome number of the parental cell during telophase. At the completion of telophase, nuclear membrane and nucleolus reappear. Meiosis – II is similar to mitosis. Both the daughter cells formed by meiosis – I undergo meiosis – II and produce four haploid daughter cells.

The stage between two meiotic stages is called interkinesis and is generally short lived.

- Approximately how many cells are present in the body of an adult person ?  
(a)  $10^{14}$       (b)  $10^{15}$       (c)  $10^{18}$       (d)  $10^{21}$
- The period between two successive cell divisions is called.....  
(a) Duplication      (b) Growth phase      (c) Cell cycle      (d) Interphase
- Which is fundamental property of all living organisms ?  
(a) Respiration      (b) Germination      (c) Growth      (d) Photosynthesis

4. Which factors are required for growth ?
  - (a) An increase in group of cells, a duplication of genetic material
  - (b) An increase in group of cells, production of daughter cells by mitosis
  - (c) A duplication of genetic material and a division assuring that daughter cells receive an equal complement of genetic material.
  - (d) An increase in cell mass, a duplication of genetic material, a division assuring that each daughter cell receives an equal complement of the genetic material
5. With how many cell reproduction starts ?
  - (a) Two cells      (b) Single cell (c) Many cells                      (d) Somatic cell
6. Which of the following is present in maximum number in an adult person ?
  - (a) Somatic cell    (b) Gamete            (c) Reproductive cell    (d) Zygote
7. At the end of which stage does cell enter mitosis ?
  - (a)  $G_1$  - phase    (b) S - phase (c) M - phase                      (d)  $G_2$  - phase
8. What is synthesized during  $G_2$  – phase ?
  - (a) Protein    (b) Micro tubules (c) RNA                      (d) (a) and (b)
9. The sequence in the cell cycle is.....
  - (a) S,  $G_1$ ,  $G_2$  M    (b)  $G_1$ , S  $G_2$ , M    (c) S, M  $G_1$ ,  $G_2$ , M    (d)  $G_2$ , S, M,  $G_1$
10. Synthesis of RNA and protein takes place in which phase of the cell cycle ?
  - (a) S-phase            (b) M-phase            (c)  $G_1$ -phase            (d) Metaphase
11. During which phase can nucleolus be observed clearly ?
  - (a) Metaphase-II      (b) Early Prophase
  - (c) Anaphase            (d) Metaphase
12. Which structure can be observed at the surface of centromere during metaphase ?
  - (a) Kinetochores      (b) Chromatophore    (c) Kinetophore    (d) Chromatophore
13. Mitosis actually means.....
  - (a) Reduction in number of chromosomes
  - (b) Division of nucleus only
  - (c) Division of cytoplasm only
  - (d) Both nuclear (Karyokinesis) and cytoplasmic divisions.
14. The role of mitosis is not merely to divide a cell into two daughter cells but to ensure genetic continuity from one cell generation. The mechanism ensuring genetic continuity is;
  - (a) Formation of two cells with identical DNA
  - (b) The new cells have half the number of chromosomes.
  - (c) Formation of cell by new chromosome
  - (d) Formation of two daughter cells
15. Substances that interface with microtubule function interfere with cell division because....
  - (a) Microtubules are distributed equally in the new cells
  - (b) Microtubules are involved in precise separate set of chromosomes get into each daughter cells.



- (c) Without microtubules, cytokinesis cannot take place and a membrane is formed.  
 (d) Microtubules are essential for the disappearance of the nuclear membrane and without them the chromosomes have to stay close together within the nuclear membrane to be able to separate into two new nuclei.
16. The stage of mitosis during which the nucleolus disintegrates and chromosomes appear is known as  
 (a) Interphase (b) Metaphase (c) Prophase (d) Anaphase
17. Chromosomes can be counted during :  
 (a) Prophase (b) Metaphase (c) Anaphase (d) Telophase
18. The nuclear membrane disintegrates and spindle appears at :  
 (a) Prometaphase (b) Early prophase  
 (c) Late telophase (d) Late prophase
19. The separation of two chromatids of each chromosome during early anaphase is initiated by :  
 (a) The interaction of centromere with the chromosomal fibres.  
 (b) The elongation of metaphytic spindle  
 (c) Attachment of spindle fibres with Kinetochore  
 (d) All the above
20. The telophase stage of mitosis is.....  
 (a) The last stage of karyokinesis  
 (b) More or less opposite of prophase stage.  
 (c) The stage where spindle fibres are absorbed in cytoplasm  
 (d) All of the above
21. The term 'karyokinesis' is used for....  
 (a) Disappearance of nuclear membrane during metaphase  
 (b) Changes occurring at anaphase, when chromosomes move to the opposite poles.  
 (c) Event occurring during interphase  
 (d) Over all changes occurring in nucleus during the cell division.
22. How many mitotic divisions must occur in a cell to form 1024 cells ?  
 (a) 20 (b) 10 (c) 40 (d) 64
23. The difference in the division of a plant cell and animal cell is in.....  
 (a) Cell membrane formation  
 (b) Spindle formation  
 (c) Movement of chromosomes from equatorial plane  
 (d) Coiling of the chromosomes
24. During which phase of prophase-I of meiosis does the process of synapsis occur ?  
 (a) Pachytene (b) Zygotene  
 (c) Leptotene (d) Diplotene

25. In mitosis the daughter cells resemble to their parent cell. But in meiosis they differ not only from parent cell in having half the number of chromosomes, but also differ among themselves qualitatively in genetic constitution due to.....
- (a) Segregation and crossing over only  
 (b) Independent assortment and segregation only  
 (c) Crossing over, independent assortment and segregation  
 (d) Independent assortment and crossing over only
26. Which is the longest phase of meiotic division ?
- (a) Prophase-I (b) Metaphase-I (c) Anaphase-I (d) Telophase-I
27. At which stage, the homologous chromosomes separate due to repulsion, but are yet held by chiasmata :
- (a) Zygotene (b) Pachytene (c) Diplotene (d) Diakinesis
28. If there are four chromosomes present during prophase – I, how many chromosome are there in each cell at the end of anaphase - II
- (a) 4 (b) 8 (c) 2 (d) 16
29. Meiosis – II is :
- (a) Cell division (b) Mitotic division  
 (c) Commonly cell elongation (d) Reduction division
30. Significance of meiosis is associated with :
- (a) DNA duplication (b) Asexual reproduction  
 (c) Sexual reproduction (d) Growth of the body
31. The minimum number of meiotic divisions required to obtain 100 pollen grain of wheat is.....
- (a) 40 (b) 25 (c) 150 (d) 200
32. The number of meiotic divisions required to produce 400 seeds in a pea plant is.....
- (a) 200 (b) 700 (c) 500 (d) 400
33. Significance of meiosis.....
- (a) The number of chromosomes is maintained in all cells.  
 (b) It is important process for evolution  
 (c) Due to division, cell can maintain their efficient size.  
 (d) A very significant contributing of mitosis is cell repair
34. In which of the following matters mitosis and meiosis are similar ?
- (a) Both are preceded by DNA replication  
 (b) Both have pairing of homologous chromosomes  
 (c) Both process occurs in all kinds of cells  
 (d) Both include separation of paired chromosomes.
35. During which of the following phases of mitosis asters appear around the centrosomes ?
- (a) Prophase (b) Metaphase  
 (c) Anaphase (d) Telophase

36. During which stage of meiosis crossing over takes place ?  
 (a) Leptotene (b) Zygotene (c) Diakinesis (d) Pachytene
37. At which of the following stages of cell cycle proteins and microtubules, required for mitosis, are synthesized ?  
 (a) G<sub>2</sub> phase (b) G<sub>1</sub> phase (c) Interphase (d) M phase
38. If the initial amount of DNA is denoted as 2C then it increases into :  
 (a) 2C (b) 4C (c) 8C (d) 6C
39. A. During interphase, chromosomes are recognized as chromatin network.  
 R. Chromosomes are highly dispersed during this phase.  
 (a) Both A and R are true and R is correct explanation of A.  
 (b) Both A and R are true and R is not correct explanation of A  
 (c) A is true and R is wrong  
 (d) A is wrong and R is true
40. A. G<sub>1</sub> phase is also called growth phase.  
 R. There is a lot of biosynthetic activity during  
 (a) Both A and R are true and R is correct explanation of A.  
 (b) Both A and R are true and R is not correct explanation of A  
 (c) A is true and R is wrong  
 (d) A is wrong and R is true
41. A. The meiotic division-I is also called reduction division.  
 R. During this the chromosomes are distributed in two cells in half their number.  
 (a) Both A and R are true and R is correct explanation of A.  
 (b) Both A and R are true and R is not correct explanation of A  
 (c) A is true and R is wrong  
 (d) A is wrong and R is true
42. A. During meiosis, the genetic material is replicated twice whereas the cell divides one.  
 R. Meiosis takes place in plants and animals during the formation of reproductive cells.  
 (a) Both A and R are true and R is correct explanation of A.  
 (b) Both A and R are true and R is not correct explanation of A  
 (c) A is true and R is wrong  
 (d) A is wrong and R is true
43. A. Number of chiasmata is more in longer chromosomes.  
 R. The number of chiasmata depends on the length of chromosomes.  
 (a) Both A and R are true and R is correct explanation of A.  
 (b) Both A and R are true and R is not correct explanation of A  
 (c) A is true and R is wrong  
 (d) A is wrong and R is true

44. Statement – P:  $G_1$  stage is the last stage or interphase.  
 Statement – Q: Synthesis of DNA takes place in  $G_2$  stage.  
 (a) Statement P and Q both are correct  
 (b) Statement P is correct statement Q is wrong  
 (c) Statement P is wrong and statement Q is correct  
 (d) Statement P and Q both are wrong
45. Statement – P: Interphase is divided in three sub phases.  
 Statement – Q:  $G_1$  phase is the initial phase of interphase.  
 (a) Statement P and Q both are correct  
 (b) Statement P is correct statement Q is wrong  
 (c) Statement P is wrong and statement Q is correct  
 (d) Statement P and Q both are wrong
46. Statement – P: In ‘S’ stage centrosome is duplicated  
 Statement – Q: In the prophase centrioles separate from each other and move towards the opposite poles.  
 (a) Statement P and Q both are correct  
 (b) Statement P is correct statement Q is wrong  
 (c) Statement P is wrong and statement Q is correct  
 (d) Statement P and Q both are wrong
47. For the statement ‘X’ and statement ‘Y’ which of the following option is correct ?  
 Statement – ‘X’ :During meiosis the genetic material is replicated once.  
 Statement – ‘Y’ : Genetic material is not replicated during interkinesis.  
 (a) Both statements ‘X’ and ‘Y’ are correct  
 (b) ‘X’ is correct and ‘Y’ is wrong  
 (c) Both statements ‘X’ and ‘Y’ are wrong  
 (d) ‘X’ is wrong and ‘Y’ is correct
48. Match the following :
- | <b>Column-I</b> | <b>Column-II</b>                           |           |
|-----------------|--|-----------|
| (A) $G_1$ Phase | (i) Synthesis of proteins and Microtubules |           |
| (B) S Phase     | (ii) Growth phase                          |           |
| (C) $G_2$ Phase | (iii) Replication of DNA                   |           |
| (a) (A - i)     | (B - ii)                                   | (C - iii) |
| (b) (A - iii)   | (B - ii)                                   | (C - i)   |
| (c) (A - ii)    | (B - iii)                                  | (C - i)   |
| (d) (A - i)     | (B - iii)                                  | (C - ii)  |

49. Match the following :

**Column-I**

**Column-II**

- |                 |  |
|-----------------|--|
| (A) Prophase    | (i) Nuclear membrane and other organelles reorganise |
| (B) Metaphase   | (ii) Arrangement of chromatids on the poles          |
| (C) Anaphase    | (iii) Formation of cytoplasmic fibres of proteins    |
| (D) Telophase   | (iv) Arranged on equatorial plane                    |
| (E) Cytokinesis | (v) The formation of syncytium                       |

- |               |           |           |          |         |
|---------------|-----------|-----------|----------|---------|
| (a) (A - i)   | (B - ii)  | (C - iii) | (D - iv) | (E - v) |
| (b) (A - iii) | (B - iv)  | (C - ii)  | (D - i)  | (E - v) |
| (c) (A - v)   | (B - iv)  | (C - iii) | (D - ii) | (E - i) |
| (d) (A - ii)  | (B - iii) | (C - iv)  | (D - v)  | (E - i) |

50. Match the following :

**Column-I**

**Column-II**

- |                |  |
|----------------|--|
| (A) Leptotene  | (i) Nucleolus disappears                 |
| (B) Zygotene   | (ii) Appearance of recombination nodules |
| (C) Pachytene  | (iii) Development of Synapsis            |
| (D) Diplotene  | (iv) Chromosome appears filamentous      |
| (E) Diakinesis | (v) Genes exchange at chiasmata          |

- |              |           |           |          |         |
|--------------|-----------|-----------|----------|---------|
| (a) (A - iv) | (B - iii) | (C - ii)  | (D - v)  | (E - i) |
| (b) (A - i)  | (B - ii)  | (C - iii) | (D - iv) | (E - v) |
| (c) (A - v)  | (B - iv)  | (C - iii) | (D - ii) | (E - i) |
| (d) (A - ii) | (B - iii) | (C - iv)  | (D - r)  | (E - i) |

51. Match the following :

**Column-I**

**Column-II**

- |                               |  |
|-------------------------------|--|
| (A) Prophase-I<br>centromere. | (i) Chromosomes move toward one plane along with |
| (B) Metaphase-II              | (ii) Half the number of chromosomes is seen      |
| (C) Anaphase-I                | (iii) Longest phase of meiosis-I                 |
| (D) Telophase-I               | (iv) Two nuclei are seen                         |

- |               |           |           |           |
|---------------|-----------|-----------|-----------|
| (a) (A - iii) | (B - i)   | (C - ii)  | (D - iv)  |
| (b) (A - i)   | (B - ii)  | (C - iii) | (D - iv)  |
| (c) (A - ii)  | (B - iii) | (C - iv)  | (D - i)   |
| (d) (A - iv)  | (B - i)   | (C - i)   | (D - iii) |

52. Match the following :

**Column-I**

**Column-II**

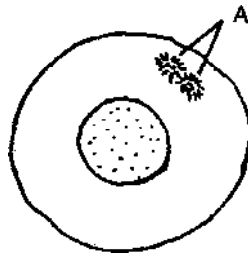
- |                 |  |
|-----------------|--|
| (A) Cytokinesis | (i) Reformation of nuclear Membrane and golgi body |
| (B) Metaphase   | (ii) Synthesis of RNA and protein                  |

- (C)    Telophase                      (iii) Centromeres of chromosomes are arranged on equatorial plate.
- (D)    Interphase                      (iv) Contraction of chromosomes starts  
  (v) The formation of synctium
- (a) (A - i)              (B - ii)              (C - iii)    (D - iv)  
 (b) (A - iv)             (B - iii)             (C - i)        (D - ii)  
 (c) (A - iv)             (B - ii)             (C - i)        (D - iv)  
 (d) (A - iv)             (B - iii)             (C - ii)        (D - i)
53. Select correct statements for cell cycle.
- (i) Yeast cell can complete on cell cycle in every 90 minutes  
 (ii) A period between creation of a cell and division of that cell.  
 (iii) Cell cycle is mainly divided into interphase and differentiation like two phases.
- (a) (i) and (ii) only      (b) (i) and (iii) only  
 (c) (ii) and (iii) only    (d) (i), (ii) and (iii)
54. Which of the following statements is/are correct for prophase of mitosis ?
- (i) At the end of this phase nuclear membrane and nucleolus disintegrate.  
 (ii) At the end of this phase two chromosomes and a centromere holding them together.  
 (iii) This phase begins with the condensation of chromatids along their lengths.
- (a) (i) only                (b) only (i) and (ii)  
 (c) only (ii) and (iii)    (d) (i) and (iii)
55. Which of the following statements is/are correct for Prophase-I ?
- (i) During diplotene, the members of each pair of homologous chromosomes start moving away from one another.  
 (ii) In zygotene, bivalent chromosomes appear tetravalent.  
 (iii) In diakinesis, chromatids become separated even at the site of chiasmata.
- (a) only (i)                (b) only (ii)  
 (c) only (i) and (iii)     (d) (i), (ii) and (iii)
56. Which of the following statements is/are correct for Meiosis-II ?
- (i) Chromosomes are arranged on equatorial plate in prophase-II  
 (ii) Nucleolus disappears during telophase-II  
 (iii) In anaphase-II, the chromatids with their independent centromeres are called chromosomes.  
 (iv) In metaphase-II, centromere of each chromosome becomes attached to filament of bipolar spindle.
- (a) only (i) and (ii)      (b) only (iii) and (iv)  
 (c) only (i), (ii) and (iii)    (d) (i), (ii) and (iii)
57. Find out the incorrect pair.
- (a) Telophase – Chromatin is observed  
 (b)  $G_1$  phase – New DNA is synthesized

- (c) Prophase – nuclear membrane disintegrates  
 (d) Zygotene - Synapsis
58. Find the incorrect pair.  
 (a) Bipolar spindle – Cytoplasmic fibres of protein  
 (b) Prophase – Chromosome made up of two chromatids and centromere  
 (c) Anaphase – Equatorial plate  
 (d) Metaphase - Kinetochore
59. From the following which pair does not match ?  
 (a) S – state – Synthesis of DNA  
 (b) Meiosis – One parental cell produces two daughter cells  
 (c) Anaphase – Each chromatid with independent centromere.  
 (d) Zygotene - Synapsis
60. Which one is a correct pair ?  
 (a) G<sub>2</sub> phase – Growth phase                      (c) S phase – DNA synthesis  
 (b) M phase - Interphase                              (d) G<sub>1</sub> phase – RNA and DNA synthesis
61. “The number of chiasmata depends on chromosomes” – What is the mistake in the given statement ?  
 (a) Width of chromosome – Word is not mentioned  
 (b) Size of chromosome – Word is not mentioned  
 (c) Number of chromosome – Word is not mentioned  
 (d) Length of chromosome – Word is not mentioned
62. Which is the true statement for mitosis ?  
 (a) Cell formed by it performs diverse functions i.e. show division of labour  
 (b) The number of chromosomes in the new cells are half than that of the parent cell.  
 (c) Two cells are formed as a result of this division are identical in all aspects.  
 (d) Cells formed as a result of mitosis have different genetic characters.
63. Which of the following statement is true for mitosis ?  
 (a) Cytokinesis and karyokinesis occur together  
 (b) Cytokinesis and karyokinesis are random  
 (c) Cytokinesis precedes karyokinesis  
 (d) Karyokinesis precedes cytokinesis
64. During interphase.....  
 (a) Replication of DNA occurs.                      (c) Replication of centriole.  
 (b) Chromosomes can be observed only as chromatin.                      (d) All the above.
65. Identify the correct sequence of karyokinesis stages :  
 (a) Prophase, Anaphase, Metaphase, Telophase  
 (b) Prophase, Metaphase, Anaphase, Telophase  
 (c) Prophase, Telophase, Metaphase, Anaphase  
 (d) Prophase, Metaphase, Telophase, Anaphase

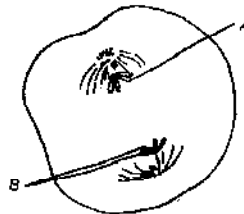
66. What is shown by given diagram and what is indicated as 'A' in it ?

- (a) Early prophase;  
A = Cleavage furrow
- (b) Interphase ( $G_2$ );  
A = Centrosomes
- (c) Late prophase;  
A = Kinetochore
- (d) Interphase ( $G_1$ );  
A = Centrosomes



67. Identify 'A' and 'B' in given diagram.

- (a) A = Centrosomes;  
B = Kinetochore
- (b) A = Cleavage furrow;  
B = Centriole
- (c) A = Kinetochore;  
B = Sister chromatids
- (d) A = Sister chromatids;  
B = Kinetochore

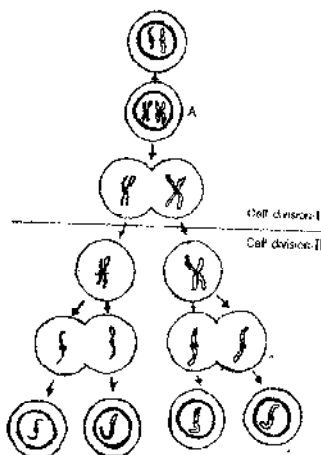


68. Which stage of mitosis is indicated by given diagram ?

- (a) Interphase ( $G_1$ )
- (b) Telophase
- (c) Metaphase
- (d) Late Prophase



69. Which process is indicated by given diagram ?



- (a) Cell division during formation of reproductive cells.
- (b) Cell division in somatic cells.
- (c) (a) and (b) both
- (d) Amitosis



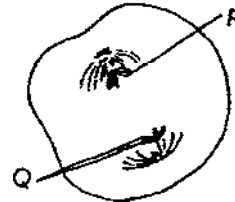
70. In the given diagram “a” and “b”, which stage of mitosis is indicated ?



- (a) a = Early prophase      b = Anaphase
- (b) a = Metaphase          b = Telophase
- (c) a = Telophase          b = Telophase
- (d) a = Late prophase      b = Anaphase

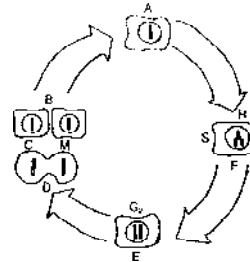
71. Identify “P” and “Q” and mention the stage of given diagram.

- (a) Chromatids, kinetochore, late prophase
- (b) Kinetochore, chromatids, late prophase
- (c) Late prophase kinetochore, chromatids
- (d) Preprophase, kinetochore, chromatids



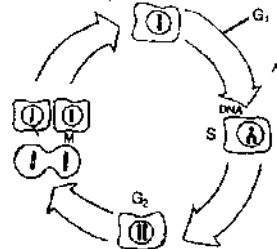
72. What does “S” indicate in the given figure ?

- (a) Nucleus of cells with chromosomes
- (b) A cell with duplicated chromosomes
- (c) Segregation of chromosomes
- (d) Duplication of chromosomes



73. What does “G<sub>1</sub>” indicate in given figure ?

- (a) Segregation of chromosomes
- (b) Nucleus with chromosomes in cell
- (c) Duplication of chromosomes
- (d) A cell with duplicated chromosomes



74. What does “P” and “Q” indicate in given diagram ?

- (a) Centrosome, spindle fibres
- (b) Kinetochore, sister chromatids
- (c) Centrosome, chromosome
- (d) Chromatids, centromere



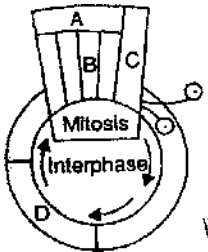
75. What does “R” indicate in the given diagram ?

- (a) Cytoplasm                  (b) Kinetochore
- (c) Spindle fibers          (d) Cleavage furrow



76. Which of the following cell can complete one cell cycle in 90 minutes ?  
 (a) Plant cell (b) Animal Cell (c) Angal cell (d) Yeast Cell
77. Which plant material is best suited for studying mitosis in class room ?  
 (a) Root tips (b) Anther (c) Pieces of bark (d) Shoot apex
78. Mitosis can occur in  
 (a) Haploid and diploid cells both (b) Pollen mother cells  
 (c) Haploid cell only (d) Diploid cell only
79. Genetic homogeneity and exact similarity between chromosomes of various cell within the same type of issue of plant is due to :  
 (a) Cytokinesis (b) Meiosis (c) Mitosis (d) Fertilization
80. Spindle fibres are composed of :  
 (a) Lipids (b) Pectins (c) Proteins (d) Cellulose
81. In the plant cell, cytokinesis occurs by  
 (a) Separation of the cytoplasm from the periphery to central region.  
 (b) Separation of the cytoplasm throughout the equatorial plane simultaneously  
 (c) Separation of the cytoplasm from cell centre to its periphery  
 (d) Following of cytoplasm from two side at right angles to the plane of spindle pole
82. Cytokinesis is generally, but not always, seen in mitosis. If cells undergo mitosis and do not follow cytokinesis then it would result in :  
 (a) Cells with abnormal small nuclei (b) Ensuring genetic homogeneity of cell  
 (c) A cell with a single large nucleus (d) A cell with two or more nuclei
83. How many time is the genetic material replicated during meiosis ?  
 (a) Twice (b) Once (c) Four times (d) None of the above
84. How does the pairs of homologous chromosomes appear during zygotene phase ?  
 (a) Univalent (b) Trivalent (c) Tetravalent (d) Bivalent
85. In which of the following stages chromosomes are not seen clearly ?  
 (a) Leptotene (b) Prophase-II (c) Diplotene (d) Metaphase-III
86. During prophase – I of meiosis homologous chromosomes pair with each other to form bivalent. A bivalent is an association of :  
 (a) Two chromatids and two centromeres (c) Four chromatids and two centromeres  
 (b) Four chromatids and four centromeres (d) Two chromatids and one centromere
87. Crossing over involves.....  
 (a) Duplication of chromosomes (b) Deletion of chromosomes  
 (c) Exchange of genetic matetial (d) Addition of chromosome
88. Crossing over occurs between.....  
 (a) Non – homologous chromatids of non homologous chromosomes  
 (b) Non – sister chromatids of homologous chromosomes  
 (c) Sister chromatids of homologous chromosomes  
 (d) Sister chromatids of non homologous chromosome

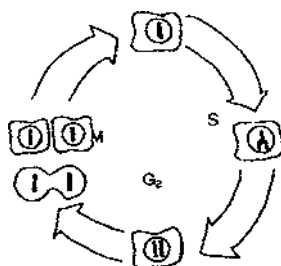
89. During meiosis centromere divides :
- (a) Only one at anaphase - II                      (b) Only once at anaphase – I  
 (c) Twice in meiosis – I & II                      (d) Twice in each cell at the end of anaphase – I & II
90. Which of the following occurs only during meiosis ?
- (a) Pairing of homologous chromosomes    (b) Separation of duplicated stands  
 (c) Cytokinesis                                      (d) Disappearance of nucleolus
91. Select the correct option from Column-I and Column-II.
- | <b>Column-I</b> | <b>Column-II</b>                 |
|-----------------|----------------------------------|
| (A) Leptotene   | (p) Synapsis                     |
| (B) Zygotene    | (q) Formation of bipolar spindle |
| (C) Pachytene   | (r) Condensation of chromosomes  |
| (D) Diakinesis  | (s) Crossing over                |
- (a) (A - s)      (B - s)      (C - p)      (D - q)  
 (b) (A - r)      (B - r)      (C - s)      (D - p)  
 (c) (A - r)      (B - r)      (C - s)      (D - q)  
 (d) (A - q)      (B - q)      (C - s)      (D - r)
92. Select the correct option from Column-I and Column-II.
- | <b>Column-I</b>          | <b>Column-II</b>                    |
|--------------------------|-------------------------------------|
| (A) G <sub>1</sub> phase | (p) Synthesis of new DNA            |
| (B) G <sub>2</sub> phase | (q) Synthesis of DNA does not occur |
| (C) S phase              | (r) DNA synthesis stops             |
- (a) (A - r)      (B - p)      (C - q)  
 (b) (A - p)      (B - r)      (C - q)  
 (c) (A - r)      (B - q)      (C - p)  
 (d) (A - q)      (B - r)      (C - p)
93. Due to crossing over, an opportunity for the exchange of genes becomes possible.
- (a) S - phase    (b) Cell Cycle    (c) Significance of meiosis    (d) G<sub>2</sub> phase
94. Which of the following statement is true for prophase ?
- (a) At the end of this phase chromosomes disappear.  
 (b) In this phase condensation of chromosome takes place along their lengths.  
 (c) At the end of this phase nuclear membrane is formed  
 (d) Centriole divides and arranged on opposite pole.
95. Syncytium means.....
- (a) small disc shaped structures at the surface of the centromeres.  
 (b) a condition arises when karyokinesis is not followed by cytokinesis.  
 (c) process of constriction of cytoplasm from peripheral region of cell that extends towards the centre.  
 (d) a multinucleate condition arises when karyokinesis and cytokinesis is over.

96. In animal cell.....  
 (a) constriction of cytoplasm begins from the peripheral region of the cell.  
 (b) middle lamella made up of pectin develops.  
 (c) constriction of cytoplasm begins from the centre of the cell.  
 (d) (a) and (b) both
97. Given below is a schematic break-up of the phases/stage of cell cycle :  
 (a) C Karyokinesis  
 (b) D Synthetic phase  
 (c) A Cytokinesis Metaphase  
 (d) B Metaphase
- 
98. Spindle fibre shorten.  
 (a) Prophase (b) Telophase (c) Metaphase (d) Anaphase
99. Nucleus is reformed  
 (a) Telophase-I (b) Prophase-II (c) Anaphase-II (d) Metaphase-II
100. Pair of homologous chromosomes become arranged at the equatorial plane of the cell.  
 (a) Metaphase-II (b) Metaphase-I (c) Metaphase (d) Zygotene
101. The period between two successive divisions is called.....  
 (a) Cell division (b) Cellcycle (c) Interphase (d) G<sub>1</sub> phase
102. The chromosomes are distributed in two cells in half their number is called.  
 (a) Mitosis (b) Cytokinesis (c) Heterotypic division (d) Cellcycle
103. What is the average cell cycle span of a human cell ?  
 (a) 17 Hrs. (b) 20 Hrs. (c) 24 Hrs. (d) 30 Hrs.
104. During cell cycle DNA replication takes place in.....  
 (a) G<sub>1</sub> - phase (b) S - phase (c) G<sub>2</sub> - phase (d) M - phase
105. During which of the following phase of mitosis asters appear round the centrioles ?  
 (a) Prophase (b) Metaphase (c) Anaphase (d) Telophase
106. At Which sub stage of meiosis crossing over takes place ?  
 (a) Leptotene (b) Zygotene (c) Pachytene (d) Diplotene
107. During which of the following stage of division nuclear membrane and nucleolus reappear ?  
 (a) Prophase (b) Metaphase (c) Anaphase (d) Telophase
108. What is average cell cycle span of a Yeast cell ?  
 (a) 70 min. (b) 85 min. (c) 90 min. (d) 120 min.
109. Interphase can be divided into how many sub phases ?  
 (a) 2 (b) 3 (c) 8 (d) 5
110. In how many phase the mitosis can be divided ?  
 (a) 4 (b) 8 (c) 3 (d) 5
111. The result of meiosis is the formation of.....  
 (a) 4 cells (b) 2 cells (c) 8 cells (d) 6 cells

112. The locations at which crossing over occurs are known as.....  
 (a) Centromere (b) Kinetochore (c) Chiasmata (d) Centriole
113. Complete disintegration of nuclear membrane and nucleolus take place during which stage of mitosis ?  
 (a) Prophase (b) Metaphase (c) Anaphase (d) Telophase
114. Which of the following structure will not be common to mitotic cell of a higher plant ?  
 (a) Cell plate (b) Centromere (c) Centriole (d) Spindle fibre
115. How many mitotic division are needed for a single cell to make 128 cells ?  
 (a) 54 (b) 25 (c) 34 (d) 7
116. Series of cell division is :  
 (a) prophase, metaphase, anaphase, telophase  
 (b) prophase, anaphase, metaphase, telophase  
 (c) prophase, metaphase, telophase, anaphase  
 (d) anaphase, metaphase, telophase, prophase
117. Meiosis involves :  
 (a) two nuclear division and one chromosome division  
 (b) two each nuclear and chromosome division  
 (c) one each nuclear and chromosome division  
 (d) one nuclear and two chromosomes division
118. The sequence of cell cycle is :  
 (a) S, M, G<sub>1</sub> and G<sub>2</sub> (b) G<sub>1</sub>, S, G<sub>2</sub> and M  
 (c) G<sub>1</sub>, G<sub>2</sub>, S and M (d) M, G<sub>1</sub>, G<sub>2</sub> and S
119. Which of the correct order of phases in prophase I ?  
 (a) Leptotene, diakinesis, pachytene, diplotene, zygotene  
 (b) Leptotene, zygotene, pachytene, diplotene, diakinesis  
 (c) Diakinesis, diplotene, pachytene, zygotene, leptotene  
 (d) Laptotene, pachytene, zygotene, diplotene, dikinesis
120. In how many cells the meiotic division has taken place, if the total number of gametes produced are 32 ?  
 (a) 4 (b) 16 (c) 8 (d) 32
121. Prophase is characterized by :  
 (a) splitting of centromere  
 (b) thread like appearance of chromosomes  
 (c) arrangement of chromosomes on metaphic plate  
 (d) pairing of homologous chromosome
122. Given :  
 (1) Chromatid (2) Monad  
 (3) Dyad (4) Daughter Chromosomes  
 (a) 1, 2, 3, 4 (b) 2, 3, 1, 4 (c) 3, 2, 1, 4 (d) 4, 3, 2, 1

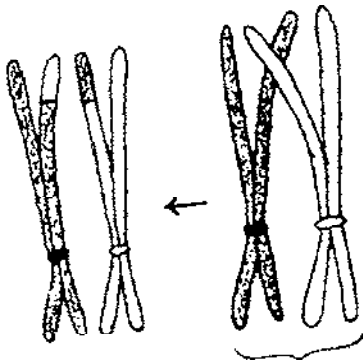
123. Phase of cell cycle unique for DNA replication is :  
 (a) S (b)  $G_1$   
 (c)  $G_2$  (d) M
124. Pairing of homologous chromosomes during zygotene is termed :  
 (a) synapse (b) synapsida  
 (c) synapsis (d) crossing over
125. At which stage of mitosis chromatids separate and passes to different poles :  
 (a) Prophase (b) Metaphase  
 (c) Anaphase (d) Telophase
126.  $G_2$  phase is between :  
 (a) end of mitosis and start of S phase  
 (b) end of S phase and start of mitosis  
 (c) start of S phase and start of mitosis  
 (d) end of S phase and end of mitosis
127. Post mitotic gap phase and synthesis phase of cell cycle are also respectively referred to as :  
 (a)  $G_2$  and S (b)  $G_1$  and S (c)  $G_1$  and  $G_2$  (d) S and  $G_2$
128. The two chromatids of a metaphase chromosome represents :  
 (a) homologous chromosome of a diploid set  
 (b) replicated chromosomes to be separated at anaphase  
 (c) non-homologous joined at the centromere  
 (d) maternal and paternal chromosomes joined at the centromere
129. If you are provided with root-tips of onion in your class and are asked to count the chromosome, which of the following stage can you most conveniently look into  
 (a) Telophase (b) Anaphase (c) Prophase (d) Metaphase
130. What is correct ?  
 (a) DNA – content become double during  $G_1$  phase.  
 (b) Duration of interphase is short as compared to M – phase.  
 (c)  $G_2$  – phase follows mitotic phase.  
 (d) DNA – replication occurs in S – phase.
131. A cell divides every one minute. At this rate of division it can fill a 100 ml of beaker in one hour. How much time does it take to fill a 50 ml beaker ?  
 (a) 30 minute (b) 60 minute (c) 59 minute (d) 32 minute
132. At which phase of meiosis, the 2 cell, each with separated sister chromatids move towards opposite poles :  
 (a) anaphase-I (b) anaphase-II (c) metaphase-I (d) metaphase-II
133. During meiosis crossing over occurs between which part of homologous chromosome ?  
 (a) sister chromatids (b) nonsister chromatids  
 (c) genes (d) alleles

134. During mitotic metaphase :
- (a) crossing over occurs  
 (b) chromosomes are divided  
 (c) chromosomes become thread like and condensed      (d) chromosomes are located at equator.
135. In meiosis the daughter cells are not similar to that of parent because of :
- (a) crossing over    (b) Synapsis      (c) both (a) and (b)    (d) none of these
136. When synapsis is completed all along the chromosome, the cell is said to have entered a stage called :
- (a) zygotene      (b) pachytene      (c) diplotene      (d) diakinesis
137. Pick out the correct statements :
- (A) Synapsis of homologous chromosomes takes place during prophase-I of meiosis.  
 (B) Division of centromeres takes place during anaphase I of meiosis.  
 (C) Spindle fibres disappear completely in telophase of mitosis.  
 (D) Nucleoli reappear at telophase I of meiosis
- (a) A only    (b) C only    (c) A and B only      (d) A, C, and D only
138. Assertion (A) : Phase of cell division is also known as dividing phase.  
 Reason (R) : In mitotic phase new cells are produced from pre-existing cells through meiosis division.
- (a) Both A and R are true and R is the correct explanation of A.  
 (b) Both A and R are true but the R is not the correct explanation of A.  
 (c) A is true statement but R is false.  
 (d) Both A and R are false.
139. Synapsis occurs between :
- (a) m-RNA and ribosomes      (b) spindle fibres and centromere  
 (c) two homologous chromosomes    (d) a male and a female gamete
140. During mitosis nuclear membrane and nucleolus begin to disappear at :
- (a) Early metaphase      (b) Late metaphase  
 (c) Early prophase      (d) Late prophase
141. Cell cycle is divided in stages as given below Which is the correct pair ?



- (a) C – kietochore      (b) D – synthesis phase  
 (c) A – cytokinesis      (d) B – metaphase

142. IN which stage of mitosis division segregation of chromatids occur and they migrate at different polar ends.  
 (a) Prophase (b) Metaphase (c) Anaphase (d) Telophase
143. Number of chromosomes are maintained from generation to generation by :  
 (a) Mitotic division (b) Meiosis division (c) Division (d) Metamorphosis
144. How many meiotic stage are essential for producing 28 cells from one cell ?  
 (a) 7 (b) 14 (c) 28 (d) 64
145. In diploid living organisms crossing over is responsible for ?  
 (a) Recombination of linked genes (b) Dominancy of genes  
 (c) Linkage between genes (d) No Segregation of genes
146. What would be the number of chromosomes of the aleurone cells of a plant with 42 chromosomes in its root tip cells ?  
 (a) 84 (b) 21 (c) 42 (d) 63
147. Select the correct option with respect to mitosis.  
 (a) Golgi complex and endoplasmic reticulum are still visible at the end of prophase.  
 (b) Chromosomes move to the spindle equator and get aligned along equatorial plate in metaphase.  
 (c) Chromatids separate but remain in the centre of the cell in anaphase.  
 (d) Chromatids start moving towards opposite poles in telophase.
148. During gamete formation, the enzyme recombinase participate during :  
 (a) Anaphase-II (b) Prophase-I (c) Prophase-II (d) Mataphase-I
149. Given below is the representation of a certain event at a particular stage of a type of cell division.  
 Which is this stage ?



- (a) Prophase-II during meiosis (b) Prophase of mitosis  
 (c) Both prophase and metaphae of mitosis (d) Prophase-I during meiosis
150. The time period between meiotic I and meiotic II cell division is called :  
 (a) interphase (c) interkinesis  
 (b) growth phase (d) 1<sup>st</sup> gap



**ANSWER KEY**

1	A	51	A	101	B
2	C	52	C	102	C
3	C	53	A	103	C
4	D	54	A	104	B
5	B	55	C	105	A
6	A	56	B	106	C
7	D	57	B	107	D
8	D	58	C	108	C
9	B	59	B	109	B
10	C	60	C	110	A
11	B	61	D	111	C
12	A	62	C	112	C
13	D	63	D	113	A
14	A	64	D	114	C
15	B	65	B	115	D
16	C	66	B	116	A
17	B	67	D	117	A
18	D	68	B	118	B
19	C	69	A	119	B
20	D	70	D	120	C
21	D	71	A	121	B
22	B	72	D	122	B
23	A	73	B	123	A
24	B	74	B	124	C
25	C	75	D	125	C
26	A	76	D	126	B
27	C	77	A	127	B
28	C	78	A	128	B
29	B	79	C	129	D
30	C	80	C	130	D
31	B	81	C	131	C
32	D	82	D	132	B
33	B	83	B	133	B
34	B	84	D	134	D
35	A	85	B	135	A
36	C	86	C	136	B
37	A	87	C	137	D
38	B	88	B	138	C
39	A	89	A	139	C
40	A	90	A	140	D
41	A	91	C	141	B
42	D	92	D	142	C
43	A	93	C	143	B
44	D	94	B	144	A
45	A	95	B	145	A
46	C	96	C	146	D
47	A	97	B	147	B
48	C	98	D	148	B
49	B	99	A	149	D
50	A	100	B	150	C

## Unit -IV

### Chapter 14. TRANSPORT IN PLANTS

#### IMPORTANT POINTS

Transport over a longer distance proceeds through the vascular system is called translocation. In rooted plants, transport in xylem is unidirectional from roots to the stems. Organic and mineral nutrients undergo multidirectional transport.

The molecule of any substance move away from their higher concentration to their lower concentration, this process is called diffusion. In facilitated diffusion special proteins help to move substances across membranes without utilization of energy from ATP.

Water potential is a potential energy of water. It is designated by the greek letter “Psi” - symbol is  $\psi$

The osmosis can be defined as - “When two solutions of unequal concentrations are separated by a semi permeable membrane the solvent (water) diffuses from dilute solution to concentrated solution.” This process will continue till the concentration of solutions becomes the equal.

When a living plant cell is placed in a hypertonic solution. (a concentrated solution of sugar or salt.) water moves out of the cell and membrane shrinks away from its cell wall. This phenomenon is known as plasmolysis. The process of plasmolysis can be reversed if the cell is placed in the hypotonic solution. The water enters into the cell causing the cytoplasm to develop the pressure against cell wall. This pressure is called turgor pressure and the swollen condition of a cell is called cell’s turgidity.

The water is absorbed by root hairs moves through cortical cells and reaches xylem by following two distinct pathways : (1) Apoplast pathway and (2) Symplast pathway.

The movement of water and minerals absorbed by the root system of plants, towards stem and the leaves is called ascent of sap. Two main theories are proposed (1) Root pressure theory and (2) Transpiration pull theory. The loss of water from the plant in the form of vapour is known as transpiration There are three main kinds of transpiration (1) Cuticular (2) Lenticular and (3) Stomatal. The food is transported by phloem from source to sink. The hypothesis for the translocation of sugar from source to sink is known as mass flow or the pressure flow hypothesis.

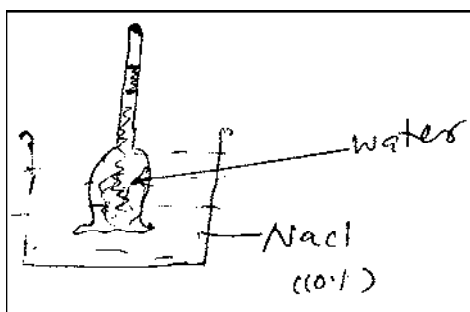
**For the given options select the correct options (a, b, c, d) each carries one mark.**

1. Match A and B :

- | A                       | B  |
|-------------------------|--|
| (p) Simple diffusion    | (i) Uphill transport                                   |
| (q) Faciliate diffusion | (ii) Membrane protein that have a hydrophilic moiety.  |
| (r) Active transport    | (iii) Membrane protein that have a hydrophobic moiety. |
| (s) Water potential.    | (iv) The potential energy.                             |
| (v) Passive transport   |  |

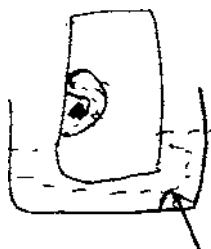
- |     | p     | q     | r     | s    |
|-----|-------|-------|-------|------|
| (a) | (v)   | (iii) | (i)   | (iv) |
| (b) | (i)   | (ii)  | (iii) | (v)  |
| (c) | (v)   | (ii)  | (i)   | (iv) |
| (d) | (iii) | (v)   | (ii)  | (i)  |

2. The pressure at which the entry of water across the semipermeable membrane stops is called .....  
 (a) Turgor pressure (b) Root pressure (c) Osmotic pressure (d) Diffusion pressure
3. What happens in this figure ?



- (a) Water from beaker will enter the thistle funnel.
  - (b) Water from thistle funnel will enter in the beaker.
  - (c) NaCl enter from beaker to thistle funnel.
  - (d) Osmosis does not occur.
4. A ..... force exists between the walls of xylem vessels and water.  
 (a) Cohesion (b) Gravitational  
 (c) Adhesive (d) Transpiration pull
  5. The process by which water is forcibly pushed beyond endodermis of root is known as .....  
 (a) Apoplast pathway (b) Symplast pathway  
 (c) Diffusion (d) Transmembrane transport
  6. By which type of transpiration largest amount of water is lost ?  
 (a) Guttation (b) Cuticular  
 (c) Stomata (d) Lenticular
  7. The value of osmotic pressure depends on .....  
 (a) Concentration of solute (b) Concentration of solvent  
 (c) Concentration of solution (d) Concentration of substrate
  8. If the external solution is more dilute than the cytoplasm is known as .....  
 (a) Hypertonic (b) Hypotonic  
 (c) Isotonic (d) 'a' and 'b' both
  9. Membrane protein is responsible for transport of  
 (a) Water molecule  
 (b) Transpiration of H<sub>2</sub>O  
 (c) Active transport  
 (d) Passive transport
  10. The +ve value of  $\psi P$  is called .....  
 (a) Osmotic pressure (b) Root pressure (c) Turgor pressure (d) Imbibition pressure

11. What happens in this figure ?



- (a) Exo osmosis                      (b) Endo osmosis  
 (c) Cell swollen                      (d) Cell remain in same condition
12. In older dying leaves to younger leaves the mineral ions are assimilated into .....  
 (a) In organic compound  
 (b) Organic compound  
 (c) Deposition of Inorganic compound and organic compound.  
 (d) None of the above
13. Which elements are readily mobilized in plants ?  
 (a) S, N, Mo                      (b) K, N, Mo                      (c) P, S, N                      (d) S, N, B
14. In term of fixing CO<sub>2</sub>, C<sub>4</sub> plants are ..... efficient as C<sub>3</sub> plants.  
 (a) Thrice                      (b) Twice                      (c) Less                      (d) Not
15. When a cell is placed in 0.50M concentrated sugar solution, there is no change in it. So the external solution is called .....  
 (a) Hypertonic                      (b) Isotonic  
 (c) Hypotonic                      (d) Colloidal
16. The pressure that prevails in cell due to number of substances dissolved in cell sap is .....  
 (a) Wall pressure                      (b) Turgor pressure  
 (c) Osmotic pressure                      (d) Diffusion pressure
17. The plasmolysed cells regain turgidity and assume original volume under influence of hypotonic solution. The process is called  
 (a) Plasmolysis                      (b) Deplasmolysis  
 (c) Endo osmosis                      (d) Exo osmosis
18. An animal cell placed in pure water will  
 (a) Swell up and burst                      (b) Shrink and die  
 (c) Shrink and undergo plasmolysis                      (d) Swell up and develop turgidity
19. Passage of water across a selectively permeable membrane is  
 (a) Active transport                      (b) Pinocytosis                      (c) Facilitated diffusion                      (d) Osmosis
20. Seeds placed in water imbibe the water because of  
 (a) Exosmosis                      (b) Higher  $\psi_w$   
 (c) Lower  $\psi_w$                       (d) Pressure of vacuoles

21. In thistle funnel experiment, entry of water into thistle funnel stops after some time automatically due to
  - (a) Diffusion of sugar out of thistle funnel.
  - (b) External and internal solutions become isotonic.
  - (c) Development of hydrostatic pressure in the thistle funnel.
  - (d) Development of hydrostatic pressure in the beaker.
22. In plants the process in which loss of water occurs in form of water vapour is
  - (a) Respiration
  - (b) Guttation
  - (c) Transpiration
  - (d) Exosmosis
23. Stomatal aperture is surrounded by guard cells and opens when guard cells are
  - (a) Flaccid
  - (b) Turgid
  - (c) Bean shaped
  - (d) Dumb-bell shaped
24. Stomatal frequency indicates.
  - (a) Number of stomata per unit area
  - (b) Rate of water loss
  - (c) Rate of gaseous exchange
  - (d) Width of stomatal aperture
25. In dorsiventral leaf, the number of stomata per unit area are generally.
  - (a) Same on both the surface
  - (b) More on lower surface (epidermis)
  - (c) More on upper surface (epidermis)
  - (d) Absent on upper surface
26. In isobilateral leaf, the number of stomata per unit area are.
  - (a) More on upper surface
  - (b) More on lower surface
  - (c) Approximately same on both the surfaces
  - (d) Absent on both the surfaces
27. In xerophytic leaf the stomata are situated.
  - (a) On both surfaces
  - (b) On upper surface
  - (c) On lower surface
  - (d) Absent from both surfaces
28. The loss of water in form of water drops is called.
  - (a) Transpiration
  - (b) Respiration
  - (c) Guttation
  - (d) Exosmosis
29. Transpiration is unavoidable evil because of
  - (a) Structure of leaf and harmful effect
  - (b) Beneficial and harmful effect.
  - (c) Maintenance of turgidity for growth
  - (d) Gaseous exchange for photosynthesis and respiration
30. Plants with scotoactive stomata perform
  - (a)  $C_4$  photosynthesis
  - (b) CAM photosynthesis
  - (c)  $C_3$  photosynthesis
  - (d) An oxygenic photosynthesis
31. For keeping stomata open, besides  $K^+$  ions the guard cells require a constant supply of
  - (A) ABA
  - (b) ATP
  - (c) Organic acid
  - (d) Protons
32. Transpiration is a process related to
  - (a) Osmosis
  - (b) Diffusion
  - (c) Activated transport
  - (d) Facilitated diffusion
33. Rate of transpiration is inversely related to
  - (a) Humidity
  - (b) Light
  - (c) Temperature
  - (d) Water

34. Scotoactive movement of stomata is that  
 (a) Stomata open at night      (b) Stomata open during day  
 (c) Stomata close at night      (d) Stomata open both during day and night
35. The most effective light for stomatal opening is \_\_\_\_\_  
 (a) Yellow      (b) Green      (c) Red      (d) Blue
36. During high wind velocity, the stomata  
 (a) open more widely      (b) Close down  
 (c) Remain unaffected      (d) Remain unaffected but lose more water due to mass action
37. Cobalt chloride is blue in dry state. In contact with moisture, it turns in to  
 (a) Yellow      (b) Pink      (c) Red      (d) Green
38. The maximum absorption of water by roots occurs in the (region) zone of  
 (a) Root cap      (b) Cell division      (c) Cell elongation      (d) Root hairs
39. The movement of water is along  
 (a) Turgor gradient (b) DPD gradient      (c) Diffusion gradient      (d) Osmotic gradient
40. As absorbed water passes towards vascular cylinder, it must enter the cytoplasm of  
 (a) Pericycle cells (b) Endodermal cells      (c) Cortical cells      (d) Xylem parenchyma
41. Water tightly held to soil particles is called (EAMCET 1996)  
 (A) Bound water (b) Capillary water      (c) Hygroscopic water      (d) Runaway water
42. The phenomenon which forces water upward into tracheal elements of xylem in the root region is  
 (a) Transpiration (b) Root pressure      (c) Turgor pressure      (d) Imbibition pressure
43. Force for passive water absorption develops in  
 (a) Xylem      (b) Aerial parts      (c) Root      (d) Root hairs
44. The phenomenon related to active water absorption is  
 (a) Transpiration (b) Root pressure (c) Osmotic pressure      (d) Translocation
45. Root pressure can be demonstrated by means of  
 (a) wilting      (b) Guttation      (c) Transpiration      (d) Exudation
46. Root pressure theory of ascent of sap is unacceptable because  
 (a) Water can ascend without root or root pressure  
 (b) Root pressure cannot explain ascent of sap beyond 10 metres.  
 (c) Root pressure is more during early morning than afternoon.  
 (d) Root pressure does not occur in spring.
47. Transpiration cohesion theory explains that the upwards pull of water is transmitted from top to bottom by cohesion of molecules caused by  
 (a) Hydrophilic cell walls      (b) Hydrogen bonds  
 (c) Oxygen bonds      (d) Surface tension
48. Root pressure is unable to explain the ascent of sap because it is not found in  
 (a) Bryophytes      (b) All plants in all reasons  
 (c) Trees      (d) Spring

49. Ascent of sap is  
 (a) Upward movement of water in the plant  
 (b) Downward movement of organic nutrients  
 (c) Upward and downward movement of water in the plant  
 (d) Redistribution of inorganic substances in the plant
50. In xylem, the ascent of sap takes place in  
 (a) Tracheids with associated xylem parenchyma  
 (b) Xylem parenchyma  
 (c) Walls of tracheary elements  
 (d) Lumen of tracheary elements
51. Swelling of wooden frames during rains is caused by  
 (a) Endo osmosis (b) Imbibition (c) Capillarity (d) Osmosis
52. Dry seeds when placed in waeter swell up due to  
 (a) Imbibition (b) Absorption (c) Diffusion (d) Adsorption
53. A cell is plasmolysed after being kept in hypertonic solution. What will be present between cell wall and plasmalemma ?  
 (a) Isotonic solution (b) Hypertonic solution (c) Air (d) Hypotonic solution
54. Raisins placed in water swell up due to (CPMT 1988, KCET 2008)  
 (a) Plasmolysis (b) Adsorption (c) Diffusion (d) Endo osmosis
55. Root hairs absorb water from soil when (AFMC 1988, JIPMER 1986)  
 (a) Osmotic concentration is same in the two  
 (b) Solute concentration is higher in soil solution  
 (c) Solute concentration is higher in root hairs  
 (d) Absorption is active
56. A cell placed in strong salt solution will shrink because (JIPMER 1986)  
 (a) Cytoplasm will decompose (b) Mineral salts will break the cell wall  
 (c) Salt water enters the cell (d) Water comes out by exoosmosis
57. Osmosis defined as  
 (a) Flow of solvent (water) through a semipermeable membrane from less concentrated solution to more concentrated solution.  
 (b) Flow of solute from a semipermeable membrane  
 (c) Flow of water without a membrane  
 (d) None of the above
58. A cell increase in volume if the external medium is (Har. PMT 2005)  
 (a) Hypotonic (b) Hypertonic (c) Isotonic (d) None of the above
59. If a cell gets reduced in size when placed in solution, the solution is (CPMT 1988, AFMC 2009)  
 (a) Hypertonic (b) Hypotonic (c) Weak (d) Saturated

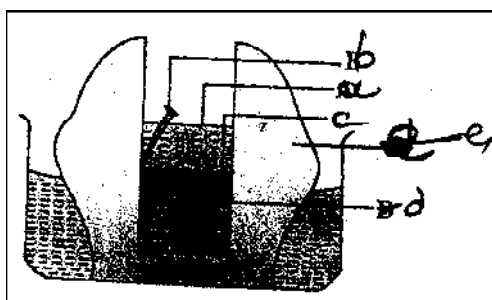
60. In a hypertonic solution a cell's water potential  
 (a) Decreases (b) Increases  
 (c) First increases then decreases (d) No change
61. An example of selectively permeable membrane is (CPMT 1988)  
 (a) Plasmalemma (b) Cell wall  
 (c) Mitochondrial membrane (d) Chloroplast membrane
62. When beet root cylinders are washed and then placed in cold water, anthocyanin does not come out. This indicates that most likely the plasma membrane is (AFMC 1990)  
 (a) Permeable to anthocyanin (b) Impermeable to anthocyanin  
 (c) Differentially permeable to anthocyanin (d) Dead structure
63. Water potential is equal to (CBSE 1988, AMV 1997)  
 (a)  $\Psi_s + OP$  (b)  $\Psi_s = TP$   
 (c)  $\Psi_p + \Psi_w$  (d)  $\Psi_p + \Psi_w$
64. Purple cabbage leaves do not pass out colour in cold water but do so in hot water because (AFMC 1988)  
 (a) Hot water enters the cell faster  
 (b) Pigment is not soluble in cold water  
 (c) Hot water destroys cell walls  
 (d) Hot water kills plasmalemma and makes it permeable
65. Which one option does not involve osmosis? (MPPMT 1991)  
 (a) Water passing from one xylem element to the other above it.  
 (b) Water passing from soil to root hair  
 (c) Water passing into mesophyll cell from xylem  
 (d) Water passing from root hair cell to cortical cell
66. A bottle filled with previously moistened mustard seeds and water was screw capped tightly and kept in a corner. It blew up suddenly after about half an hour. The phenomenon involved is  
 (a) Diffusion (b) Imbibition  
 (c) Osmosis (d) DPD (CBSE 1990)
67. When concentration of solutes is low in the soil, absorption of water is (CMPT 1987, KCET 2007)  
 (a) Stopped (b) Increased (c) Retarded (d) Normal
68. Guard cells differ from epidermal cells in having. (CPMT 1993, CBSE 2011)  
 (a) Mitochondria (b) Vacuoles  
 (c) Cell wall (d) Chloroplast
69. Wilting in plants occurs when (CPMT 1987, 1991, 2002, AFMC 2005, BHU 2006, WB 2008)  
 (a) Phloem is blocked (b) Xylem is removed / blocked  
 (c) Pith is removed (d) A few leaves are removed



70. Guttation is the process of elimination of water from plants through  
(BHU 1986, JIPMER 1987, MPPMT 1995, Orissa 2003)  
(a) Stomata (b) Hydathodes (c) Lenticels (d) Wounds
71. What is the action spectrum of transpiration ? (RPMT 1995, CET Chd. 2006)  
(a) Green and ultraviolet (b) Orange and red  
(c) Blue and far red (d) Blue and red
72. Stomata open during day time because the guard cells (CPMT 1987)  
(a) Produce osmotically active sugars or organic acids  
(b) Are thin walled  
(c) Are bean shaped  
(d) Have to help in gaseous exchange
73. Stomatal opening is under the control of (KCET 1988, Manipur 2005)  
(a) Epidermal cells (b) Palisade cells (c) Spongy cells (d) Guard cells
74. Maximum transpiration takes place from  
(a) Stem (b) Leaves (c) Roots (d) Flowers and fruits
75. It is produced during water stress that brings stomatal closure.  
(AMU 1992, CBSE 1993, 1994, 2001, RPMT 2000, JIPMER 2000, Orissa 2009, MP PMt 1992)  
(a) Ethylene (b) Abscisic acid (c) Ferulic acid (d) Coumarin
76. Transpiration is least in (CBSE 1998, BHU, 1987, KCET 2006)  
(a) Good soil moisture (b) High wind velocity  
(c) Dry environment (d) High atmospheric humidity
77. Transpiration is high in (MP PMT 1993)  
(a) Rainy season (b) Winter (c) High temperature (d) Low wind velocity
78. Potometer is an instrument that measures (Pb. PMT 1998, Manipur 2005)  
(a) Respiration (b) Photosynthesis (c) Growth (d) Transpiration
79. Wilting appears due to excessive. (MP PMT 1989, RPMT 2000, AFMC 2001, Pb. PMT 2001)  
(a) Respiration (b) Photosynthesis (c) Absorption (d) Transpiration
80. Transpiration is regulated by movement of (JIMER 2004)  
(a) Guard cells (b) Subsidiary cells (c) Epidermal cells (d) Mesophyll cells
81. Rate of transpiration is reduced with (CPMT 1987, MPPMT 1999)  
(a) Rise in temperature (b) Decrease in light intensity  
(c) Increase in wind velocity (d) Increase in water uptake
82. In terrestrial habitats, temperature and rainfall conditions are influenced by (CBSE 1989)  
(a) Water transformation (b) Transpiration  
(c) Thermoperiodism (d) Translocation
83. Conversion of starch to organic acids is required for (CBSE 1992)  
(a) Stomatal opening (b) Stomatal closing (c) Stomatal formation (d) Stomatal activity

84. Element involved in stomatal regulation its opening and closing is  
(CPMT 1989, 2004, Kerala 2000, Manipal 2001, Pb. PMT 2001, Uttrakhand 2001, DPMT 2002, Wardha 2003, 2011, AMU 2005)  
(a) Zinc (b) Magnesium (c) Potassium (d) Iron
85. In guard cells when sugar is converted into starch, the stomatal pore (CBSE 1997)  
(a) Closed completely (b) Opens partially (c) Opens fully (d) Remains unchanged
86. Water will be absorbed by root hairs when the external medium is  
(JIPMER 1986, AFMC 1993)  
(a) Hypotonic (b) Hypertonic (c) Isotonic (d) Viscous
87. Root hairs occur in the zone of (Kerala 2003)  
(a) Cell division (b) Cell elongation (c) Cell maturation (d) Mature cells
88. Path of water movement from soil to xylem is (CPMT 1989, Kerala 2008)  
(a) Meta xylem - protoxylem - cortex - soil - root hair  
(b) Cortex - root hair - endodermis - pericycle - protoxylem - meta xylem  
(c) Soil - root hair - cortex - endodermis - pericycle - protoxylem - meta xylem  
(d) Pericycle - soil - root hair - cortex endodermis - protoxylem metaxylem
89. Water in plants is transported by or ascent of sap takes place through  
(BHU 1991, DPMT 1987, CPMT 1983, 1996, MHTCET 2009)  
(a) Cambium (b) Phloem (c) Xylem (d) Epidermis
90. Water rises in the stem due to (RPMT 2000)  
(a) Cohesion and transpiration pull (b) Turgor pressure  
(c) Osmotic pressure (d) Root pressure (negative)
91. The principal pathway of water translocation in angiosperms is (CBSE 1990)  
(a) Sieve cells (b) Sieve tube elements (c) Xylem vessel system (d) Xylem and phloem
92. Which contributes most to the transport of water from soil to the leaves of a tree ?  
(CPMT 1989, MPPMT 1989)  
(a) Root pressure (b) Cohesion of water and transpiration pull  
(c) Capillary rise of water inside xylem (d) Hydrolysis of ATP
93. Cohesive force of water is due to (EAMCET 1989, EPMT 2005)  
(a) O-bonds (b) OH-bonds (c) S-bonds (d) H-bonds
94. Diffusion of water through selectively permeable membrane is (CPMT 1993)  
(a) Diffusion (b) Imbibition (c) Osmosis (d) Translocation
95. A higher plant cell covered with cutin and suberin is placed in water, after 15 minutes, the cell  
(BHU 1993)  
(a) Will be killed (b) Size will increase  
(c) Size will remain unchanged (d) Size will decrease
96. Plant cell kept in hypertonic solution will get (MPPMT 1994)  
(a) Lysed (b) Turgid (c) Deplasmolysed (d) Plasmolysed

97. The movement of free atoms from higher concentration to lower concentration is called. (RPMT 1995)  
 (a) Osmosis (b) Diffusion (c) Endosmosis (d) Exosmosis
98. Plasmolysis is due to (CPMT 1995)  
 (a) Exosmosis (b) Endosmosis (c) Osmosis (d) Adsorption
99. Cotton fibres dipped in water absorb water through (RPMT 1996)  
 (a) Endosmosis (b) Exosmosis (c) Capillarity (d) Imbibition
100. With rise in turgidity, wall pressure will (CBSE 1997)  
 (a) Decrease (b) Increase (c) Fluctuate (d) Remain unchanged
101. Root pressure is due to (MPPMT 1993, Har. PMT 2003, Orissa 2011)  
 (a) Active absorption (b) Passive absorption  
 (c) Increased transpiration (d) Increased photosynthesis
102. Adding solute to pure water will cause development of (MPPMT 2001)  
 (a) Positive water potential  
 (b) More positive water potential decreases  $\Psi_s$   
 (c) More negative water potential will not change  $\Psi_s$   
 (d) Negative water potential
103. Rate of transpiration is highest when (JKCMEE 2000)  
 (a) Soil is wet and air is dry (b) Soil is wet and air is humid  
 (c) Soil is dry and air is humid (d) Both soil and air are dry.
104. Stomata of CAM plants (CBSE 2003)  
 (a) Are always open  
 (b) Open during the day and close at night  
 (c) Open during night and close during the day  
 (d) Nerve open
105. Choose the correct combination of labelling in potato osmoscope. (Manipal PMT 2004)



- (a) a-final level, b-dot pin, c-initial level, d-sugar solution, e-potato tuber  
 (b) a-initial level, b-dot pin, c-final level, d-water, e-potato tuber  
 (c) a-final level, b-dot pin, c-initial level, d-water, e-potato tuber  
 (d) a-final level, b-dot pin, c-initial level, d- water, e-container

106. Stomata open during day time due to (Wardha 2005)  
 (a) Decrease in pH (b) Decrease in weater potential  
 (c) Increase in water potential (d) Light
107. In tall trees water is absorbed due to (Manipal 2005, Guj. CET 2011)  
 (a) Transpiration (b) Root pressure (c) Capillary action (d) Photosynthesis
108. Which one is responsible for opening of stomata ? (Guj. CET 2006)  
 (a) Decrease in CO<sub>2</sub> concentration and increse in H<sup>+</sup> ion concentration.  
 (b) Decrease in CO<sub>2</sub> cone and decrease in H<sup>+</sup> ion concentration.  
 (c) Increase in CO<sub>2</sub> cone and increase in H<sup>+</sup> ion cone.  
 (d) More free H<sup>+</sup> ions and less Cl<sup>-</sup> ions.
109. Cell wall shows (Manipur 2007)  
 (a) Semi permeability (b) Differential permeability  
 (c) Complete permeability (d) Impermeability
110. Starch of guard cells is converted into PEP through. (Guj. CET 2008)  
 (a) Hydrolysis (b) Oxidation (c) Dephosphorylation (d) Decarboxylation
111. Energy source responsible for upward flow of water is (COMED K's -2008)  
 (a) ATP (b) Sucrose (c) Solar heat (d) Light
112. Guard cells regulate (Orissa 2008, CBSE 2009)  
 (a) Respiration (b) Transpiration (c) Photosynthesis (d) Photorespiration
113. Most water flow in root occurs via apoplast as (AMV 2009)  
 (a) Cortical cells are living cells  
 (b) Cortical cells are loosely arranged  
 (c) Cortical cells are thin walled  
 (d) All the above
114. Major loss of water in transpiration occurs through (MHT, CET 2009)  
 (a) Cuticle (b) Bark (c) Hydathodes (d) Stomata
115. A negative effect of transpiration is (Guj. CET 2010)  
 (a) Development of water stress (b) Increase in mineral absorption  
 (c) Maintanance of leaf temperature (d) Causing cooling
116. What causes opening of stomata (Guj. CET 2010)  
 (a) Thin wall of guard cell facing stomatal pore is stretched more, curves in and the pore opens.  
 (b) Thick wall of guard cell facing stomatal pore is stretched more, moves in and pore opens.  
 (c) As thin wall of guard cell is stretched less, the guard cell wall facing the stomatal pore moves in and pore opens.  
 (d) Thick wall of guard cell facing the stomatal pore is stretched less, moves, in and the pore opens.
117. Whose water potential is less than water potential of root hair during water absorption by root hair. (Guj. CET 2011)  
 (a) Gravitational water (b) Pure water (c) Vacuolar sap (d) Soil solution\

118. Tracheids are less efficient than vessels due to (MHT, CET 2011)  
 (a) Absence of closed end walls (b) Uneven thickeningS  
 (c) Caspirian strips (d) Presence of tapering end walls
119. The space between plasma membrane and cell wall of a plasmolysed cell surrounded by a hypertonic solution is occupied by (KCET 2011)  
 (a) Isotonic solution (b) Hypotonic solution  
 (c) Hypertonic solution (d) Water
120. The process by which water is absorbed by solids like colloids causing them to increase in volume is  
 (a) Facilitated diffusion (b) Diffusion (c) Osmosis (d) Imbibation
121. Stomatal opening is influenced by  
 (a) N<sub>2</sub> concentration, CO<sub>2</sub> concentration, light  
 (b) CO<sub>2</sub> concentration, temperature, light  
 (c) N<sub>2</sub> concentration, light, temperature  
 (d) CO<sub>2</sub> concentration, N<sub>2</sub> concentration, temperature
122. 2% NaCl as compared to 18% glucose solution is  
 (a) Isotonic (b) Hypotonic (c) Hypertonic (d) None of the above
123. Water absorption by root hairs occurs until (COMED-K's 2010)  
 (a) Concentration of water in the cell sap is higher  
 (b) Salt concentration in cell sap is higher  
 (c) They are separated from the soil by a selectively permeable membrane  
 (d) Water potential is lower
124. Which pathway involves cell wall and inter cellular spaces ? (COMED-K's 2010)  
 (a) Vascular pathway (b) Protoplast pathway (c) Symplast pathway (d) Apoplast pathway
125. Glucose is not stored in plants due to its effect in  
 (a) Decrease in osmotic pressure  
 (b) Increase in osmotic pressure  
 (c) Increase in turgor pressure  
 (d) Decrease in turgor pressure
126. Match the columns :
- | I                                      | II                                  |
|--|-------------------------------------|
| (a) Diffusion                          | (1) Hydrophilic substances          |
| (b) Osmosis                            | (2) Shrinkage of protoplasm         |
| (c) Imbibation                         | (3) Semipermeable membrane          |
| (d) Plasmolysis                        | (4) Free movement of ions and gases |
| (a) (a)-(2), (b)-(1), (c)-(4), (d)-(3) |                                     |
| (b) (a)-(3), (b)-(1), (c)-(4), (d)-(2) |                                     |
| (c) (a)-(2), (b)-(3), (c)-(4), (d)-(1) |                                     |
| (d) (a)-(4), (b)-(3), (c)-(1), (d)-(2) |                                     |

**Question number 127 to 141 are Assertion and Reason type of questions Which of the option is correct for them.**

Options for question number 127 to 141

- (a) Both are correct and R is the correct explanation for A.
- (b) Both are correct and R is the correct not explanation for A.
- (c) A is correct and R is wrong
- (d) R is correct and A is wrong

127. A : When water potential in the cells of leaves is lowered.  
R : Water from leaf cells moves into leaf xylem.
128. A : When evaporation is high excess water collects in the form of liquid around special opening of veins.  
R : Such water loss in liquid form is known as guttation.
129. A : A large amount of water moves through the root cortex along the apoplast pathway.  
R : Cells of cortex are loosely packed and no much resistance along them.
130. A : When water flows into the cell and out of the cell, are in equilibrium.  
R : The cell is said to be flaccid.
131. A : Effects of root pressure observable at night and early morning.  
R : At night and early morning evaporation is very low.
132. A : Uphill transport is a active transport.  
R : In active transport molecules moves in a concentration gradient.
133. A : In sunflower lower surface of leaf possesses more transpiration.  
R : Maximum transpiration occurs through stomata.
134. A : During photosynthesis sucrose is converted into starch.  
R : Sucrose is a non-reducing sugar and hence chemically stable.
135. A : The development of the  $C_4$  photosynthetic system is probably one of the strategies for maximizing the availability of  $CO_2$  and minimizing water loss.  
R :  $C_4$  plants are as twice as efficient as  $C_3$  plants in term of fixing  $CO_2$ .
136. A : In a symport two types of molecules move in opposite directions.  
R : When a molecule move across a membrane independent of other molecule, a process called uniport.
137. A : When living a plant cell placed in a hypertonic solution, cell membrane shrinks away from its cell wall.  
R : The concentration of vacular sap in a cell is higher than surrounding solution.
138. A : If we apply pressure from above on the water within the thistle funnel. We can stop entry of water through osmosis.  
R : This pressure at which the entry of water across the permeable membrane stops is called osmotic pressure.

139. A : When the temperature is high and the soil contains excess of water, the plants tends to lose water in the form of droplets from lenticles.

R : Root pressure does not regulate the rate of loss of water from lenticles.

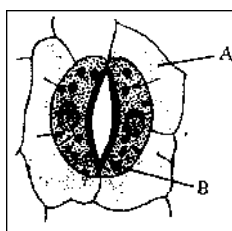
140. A : In angiosperms, the conduction of water is more efficient because their xylem has vessels.

R : Conduction of water by vessel elements is an active process with energy supplied by xylem parenchyma rich in mitochondria.

141. A : We are able to produce electricity from water fall from stored water in dams.

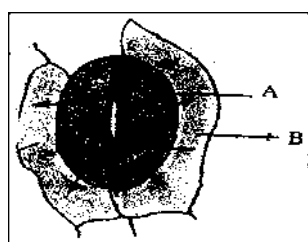
R : The gravitational pull is responsible for conversion of potential energy of water in the form of energy which can do work.

142. What does A and B indicate in the diagram ?



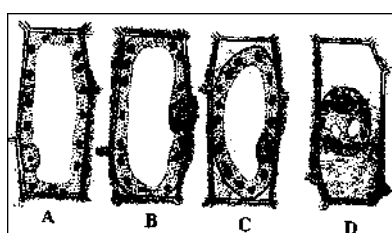
- (a) A - Epidermal cell, B - Guard cell
- (b) A - Guard cell, B - Epidermal cell
- (c) A - Thickened wall, B - Epidermal cell
- (d) A - Cytoplasmic membrane, B - Guard cell

143. What does A and B indicate in the diagram ?



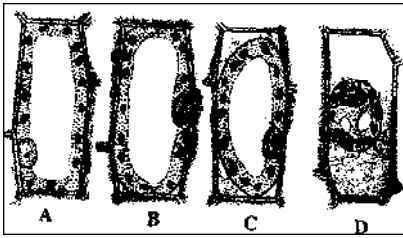
- (a) A - Epidermal Cell, B - Guard cell
- (b) A - Guard cell, B - Epidermal cell
- (c) A - Thickened wall, B - Epidermal cell
- (d) A - Cytoplasmic membrane, B - Guard cell

144. Which of the following figure shows the final stage of plasmolysis ?



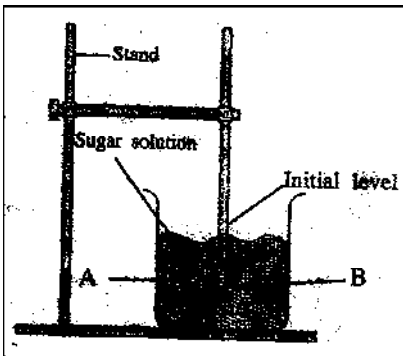
- (a) A
- (b) B
- (c) C
- (d) D

145. Which of the following figure A, B, C and D shows the initial stage of plasmolysis ?



- (a) A      (b) B      (c) C      (d) D

146. Which process is observed in the diagram ?



- (a) Imbibition      (b) Plasmolysis      (c) Osmosis      (d) Exosmosis

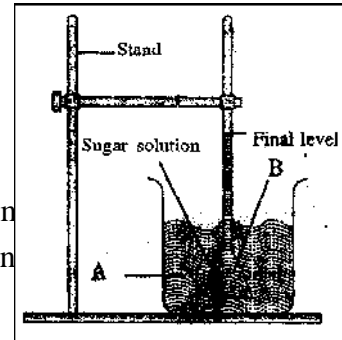
147. What does A and B indicate in the diagram thistle funnel experiment

- (a) A - water, B - concentrated sugar solution

- (b) A - water, B - sugar

- (c) A - water, B - dilute sugar solution

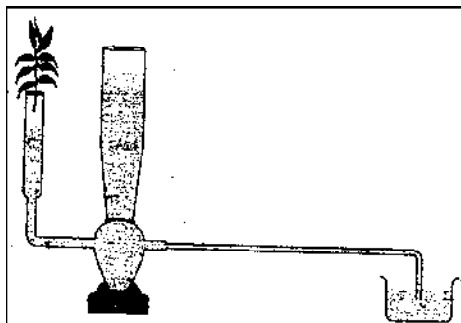
- (d) A - water, B - crystals of sugar





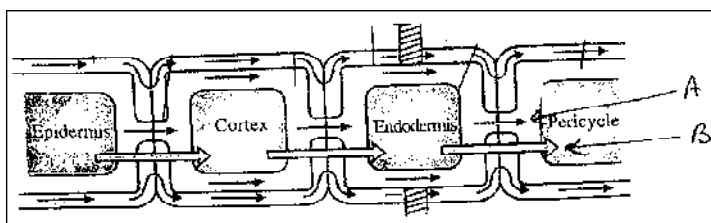
148. The experimental setup in the given diagram is for ?

(KCET 2003)



- (a) Measuring the rate of transpiration
- (b) The demonstration of development of suction force due to transpiration
- (c) The demonstration of anaerobic respiration
- (d) The demonstration of ascent of sap.

149. What is A and B in this diagram ?



- (a) A - Apoplast pathway, B - Symplast pathway
- (b) A - Vacuolar pathway, B - Symplast pathway
- (c) A - Symplast pathway, B - Vacuolar pathway
- (d) A - Apoplast pathway, B - Vacuolar pathway

150. Match the following :

Column I    Column II

- |                |                    |
|----------------|--------------------|
| (a) Hypotonic  | (i) Water          |
| (b) Hypertonic | (ii) Sucrose       |
| (c) Solute     | (iii) Low tonicity |
| (d) Solvent    | (iv) High tonicity |
- (a) (a-iii), (b-iv), (c-ii), (d-i)    (b) (a-iv), (b-ii), (c-i), (d-iii)  
 (c) (a-iii), (b-iv), (c-ii), (d-i)    (d) (a-i), (b-ii), (c-iii), (d-iv)

**ANSWER KEY**

- |          |          |          |          |
|----------|----------|----------|----------|
| 1. (c)   | 2. (c)   | 3. (d)   | 4. (c)   |
| 5. (d)   | 6. (c)   | 7. (c)   | 8. (b)   |
| 9. (c)   | 10. (c)  | 11. (d)  | 12. (b)  |
| 13. (c)  | 14. (b)  | 15. (b)  | 16. (c)  |
| 17. (b)  | 18. (a)  | 19. (d)  | 20. (c)  |
| 21. (c)  | 22. (c)  | 23. (b)  | 24. (a)  |
| 25. (b)  | 26. (c)  | 27. (c)  | 28. (c)  |
| 29. (d)  | 30. (b)  | 31. (b)  | 32. (b)  |
| 33. (a)  | 34. (a)  | 35. (d)  | 36. (b)  |
| 37. (b)  | 38. (d)  | 39. (b)  | 40. (b)  |
| 41. (c)  | 42. (b)  | 43. (b)  | 44. (b)  |
| 45. (d)  | 46. (a)  | 47. (b)  | 48. (a)  |
| 49. (d)  | 50. (b)  | 51. (a)  | 52. (b)  |
| 53. (d)  | 54. (c)  | 55. (d)  | 56. (a)  |
| 57. (a)  | 58. (a)  | 59. (a)  | 60. (a)  |
| 61. (b)  | 62. (d)  | 63. (d)  | 64. (a)  |
| 65. (b)  | 66. (b)  | 67. (d)  | 68. (b)  |
| 69. (b)  | 70. (d)  | 71. (a)  | 72. (d)  |
| 73. (b)  | 74. (b)  | 75. (d)  | 76. (c)  |
| 77. (d)  | 78. (d)  | 79. (a)  | 80. (b)  |
| 81. (b)  | 82. (a)  | 83. (c)  | 84. (a)  |
| 85. (a)  | 86. (c)  | 87. (c)  | 88. (c)  |
| 89. (a)  | 90. (c)  | 91. (b)  | 92. (d)  |
| 93. (c)  | 94. (c)  | 95. (d)  | 96. (b)  |
| 97. (a)  | 98. (c)  | 99. (b)  | 100. (a) |
| 101. (d) | 102. (a) | 103. (c) | 104. (a) |
| 105. (b) | 106. (a) | 107. (b) | 108. (c) |
| 109. (a) | 110. (c) | 111. (b) | 112. (b) |
| 113. (d) | 114. (a) | 115. (d) | 116. (c) |
| 117. (d) | 118. (c) | 119. (d) | 120. (b) |
| 121. (d) | 122. (d) | 123. (b) | 124. (d) |
| 125. (c) | 126. (c) | 127. (d) | 128. (a) |
| 129. (a) | 130. (a) | 131. (b) | 132. (b) |
| 133. (d) | 134. (a) | 135. (d) | 136. (c) |
| 137. (c) | 138. (c) | 139. (c) | 140. (a) |
| 141. (a) | 142. (a) | 143. (c) | 144. (d) |
| 145. (b) | 146. (c) | 147. (a) | 148. (b) |
| 149. (c) | 150. (c) |          |          |



## Unit - IV

### Chapter-15 Mineral Nutrition

#### IMPORTANT POINTS

The absorption, distribution and metabolism of various mineral elements by plants is called mineral nutrition. All organisms need nutrition. We know that in plants, nutrition is autotrophic. Mineral elements occur mainly in their inorganic ionic forms in the soil. Plants absorb them from the soil through their root systems. The study of mineral nutrition is concerned with the absorption of essential mineral nutrients, their important role in the plant life and the effects of their imbalanced availability cause specific symptoms.

Some methods to determine the requirement of minerals by plants are as Hydroponics, Aeroponics, and Organoponic. Criteria for Essentiality of Elements are

- (1) A plant must be unable to complete its life cycle in the absence of the mineral element.
- (2) The function of the element must not be replaceable by another mineral element.
- (3) The element must be directly involved in plant metabolism.

The nutrients or elements which are essential for the healthy growth of the plant are called essential nutrients or essential elements. About 112 elements have been discovered until now. Only twenty kinds of mineral elements are considered as essential for the plants. Most of the mineral elements present in soil are absorbed by roots of the plant. All minerals which are absorbed by plants are not 'essential mineral.' Most of the mineral nutrients, which come from the soil, are dissolved in water and absorbed through a plant's roots.

Macronutrients include - Carbon, Hydrogen, Oxygen, Nitrogen, Potassium Phosphorus, Sulphur, Calcium, and Magnesium. Micronutrients include - Manganese, Copper, Molybdenum, Boron, Zinc, Iron, Chlorine and Nickel. Sodium, Cobalt, Silicon and Vanadium are also seen to be important - 'trace elements'. C, H, O and N are Non mineral elements.

The absence or deficiency (not present in the required amount) of any of the essential elements shows to deficiency symptoms or effects in plant. The requirement of micronutrients is always low while their moderate decrease causes the deficiency symptoms and a moderate increase causes toxicity.

1. Due to which type of bacteria atmospheric  $N_2$  is maintained ?  
 (a) Nitrosomonas      (b) Rhizobium      (c) Nitrobacter      (d) Pseudomonas
2. Which method of hydroponics is used for providing nutrients to plants or seedlings in environment saturated with fine droplets of nutrients ?  
 (a) Aeroponics      (b) Continuous flow of cultured solution  
 (c) Static cultured solution      (d) Suspension culture
3. Yellowing of leaves is called -  
 (a) Tylosis      (b) Chlorosis      (c) Necrosis      (d) Florosis

4. Standards for mineral elements essentially was suggested by which scientist ?  
 (a) Julious Vonsachs (b) Cornelius Von (c) Arnon and Stout (d) Jhon Ingen house
5. What is concentration of micronutrients in the dry mass of plants per gram ?  
 (a) 1 to 10 mg (b) 0.1 mg  
 (c) 0.1 mg or less than that (d) 10 mg or more than that
6. Which group is included in Macronutrients?  
 (a) H, Mn, S (b) S, P, Ca, Mg (c) Mn, Cu, N (d) Na, Cl,
7. Which group is included in micronutrients ?  
 (a) Mn, Cu, Mo (b) Cl, Ni, Co, Mg (c) C, H, O, N (d) Cl, S, Ni, Fe
8. Out of the following, what is the function of Potasium ?  
 (a) ion balance (b) stabilizes ribosomes  
 (c) Required for iron absorption (d) In active site of many redox enzymes
9. Which element is necessary to stabilize ribosomes ?  
 (a) Mn (b) Mg (c) Mo (d) Ni
10. In which form Phosphorous is absorbed from soil ?  
 (a)  $\text{H}_3\text{PO}_4^-$  (b)  $\text{HPO}_4^-$  (c)  $\text{H}_2\text{PO}_4^-$  (d)  $\text{H}_4\text{P}_2\text{O}_7^-$
11. Which elements play significant role in structure and synthesis of chlorophyll ?  
 (a) Fe, Ca (b) Fe, Mg (c) Cu, Fe (d) Mg, Fe
12. Deficiency of which element kills terminal buds leaving a rosette effect on the plant ?  
 (a) Mo (b) B (c) Cu (d) None
13. Deficiency of which element shows stunted growth ?  
 (a) Mo, Ca, S, N (b) Cl, N, Cu, Zn (c) P, S, Mn, Ca (d) K, N, Fe, Ca
14. State importance of iron ?  
 (a) Required for activation of Carboxyalase enzyme.  
 (b) Required for the structure of Ferodoxin.  
 (c) Required for the photolysis of  $\text{H}_2\text{O}$  during photosynthesis.  
 (d) Required for the absorption and metabolism of Ca.
15. Which element is required for absorption and utilization of calcium ?  
 (a) Fe (b) Cu (c) B (d) K
16. State deficiency of Cl.  
 (a) Wilting of stubby roots (b) brown spotted fruits  
 (c) accumulaton of purple pigment (d) premature leaf fall
17. Due to which element deficiency bark of tree becomes rough and gets split and exudes gum-like secretion ?  
 (a) Zn (b) K (c) P (d) Cu
18. Which element deficiency shows bronzing leaves ?  
 (a) K (b) N (c) Ca (d) S

19. Donnan equilibrium is achieved at which surface ?  
 (a) Cell wall (b) Nuclear membrane  
 (c) plasma membrane (d) Vascular membrane
20. What is the function of Zn ?  
 (a) Synthesis of Carboxyalase enzyme  
 (b) Formation of IndolAcetic acid (IAA)  
 (c) required for absprption and utilization of Ca.  
 (d) required for maintenance of ribosomal constituent.
21. One plant is given Urea fertilizer, but it has deficiency of phosphorous, this plant will show which symptom ?  
 (a) Cambium activity reduces (b) fruit size deminishes  
 (c) Grey spots on leaves (d) seed dormancy increases.
22. State deficiency symptoms of Mo.  
 (a) fruit yeild decreases (b) fall of fruit  
 (c) N - deficiency appears. (d) death of root-apex and shoot-apex.
23. State importance of Ca.  
 (a) Structural component of plasma membrane (b) For the synthesis if IAA.  
 (c) Formation of bipolar centriole during cell-division (d) Formation of nuclear membrane
24. Deficiency of which mineral causes shortening of internodes and reduction in cambium activity ?  
 (a) K (b) Fe (c) Cu (d) B
25. In the first phase of absorption of mineral ions from soil to root, element passes through which plant ?  
 (a) Cell wall (b) Nuclear membrane(c) tonoplast (d) plasma membrane
26. By which principle, indirect storage of stable and non-diffusible ions is explained ?  
 (a) ion exchange (b) principle of mass flow  
 (c) Donnan equilibrium (d) principle of Diffusion
27. According to mass flow principle what is responsible for absorption of water ?  
 (a) Transpiration (b) Turgidity (c) Osmotic pressure (d) Turgor pressure
28. Formation of FAD during  $N_2$  fixation occurs during which processes ?  
 (a) growth and development (b) cell division and differentiation  
 (c) photosynthesis and transpiration (d) Respiration and photosynthesis
29. Which amino acid is formed when  $\alpha$  keto - glutaric acid reacts with  $NH_3$  during transmmination ?  
 (a) Glutanic acid (b) Aspartic acid (c) Oxalo-acetic acid (d) None of these
30. What is the function of leg haemoglobin ?  
 (a) To protect Nif gene from the side effect of  $O_2$   
 (b) To proctect nitrogenase from the side effect of  $O_2$   
 (c) To provide atmosheric  $N_2$  to Rhizobium bzcteria  
 (d) To synthesis reduction inducing unit FAD.

31. Toxicity of Mn inhibits function of which other elements ?  
 (a) Fe, Mg, S                      (b) Ca, Fe, Mg  
 (c) Mg, K, Fe                      (d) Ca, P, S
32. Which substances of soil water are degraded gradually by, atmosphere and microorganisms ?  
 (a) Organic material      (b) inorganic material  
 (c) elements                      (d) positive ions
33. Which inorganic substance is obtained by  $N_2$  - fraction ?  
 (a) Ammonium  
 (b) amino acid  
 (c) Ammonia  
 (d) Ammonium Hydroxide
34. Formation of  $NO_2$  and  $NO_3$  from  $NH_3$  is indentified by which name ?  
 (a) Nitration                      (b) Denitrification  
 (c) Nitrogenation              (d) Nitrification
35. The process which release  $NA_3$  from Nitrogenous excretory waste is known as  
 (a) Ammonification      (b) Denitrification  
 (c) Nitrification              (d) Demonification
36.  $ZNO_3 \rightarrow ZNO_2 \rightarrow ZNO \rightarrow N_2O \rightarrow N_2$  is which process ?  
 (a) Reductive Amination      (b) Ammonification  
 (c) Denitrification              (d) Nitrification
37. Due to natural lightening ...  
 (a) Nitrate is converted into Nitride  
 (b)  $N_2$  is converted into nitrate  
 (c) Modify from  $ZNO_3$  to  $N_2$   
 (d) to increase activity of Reductive Amination
38. A : Leguminous plant are grown between crops to increase yeild.  
 R : Rizobium bacteria are present in the root - nodules of Leguminous plant.  
 (a) Both A and R are true, & R gives correct explanation of A.  
 (b) Both A and R are true, but R is not correct explanation of A.  
 (c) A is true, but R is wrong.  
 (d) A is wrong, but R is true.
39. Which element is required for photolysis of water during photosynthesis ?  
 (a) Mo                              (b) Co  
 (c) Cu                              (d) Cl
40. Which element is necessary for meristmatic tissue and differentiating tissues ?  
 (a) Fe                              (b) N  
 (c) Ca                              (d) B

41. Which one is correct option of given Column I and Column II

**Column I**

- 1 Copper
- 2 Molybdenum
- 3 Zinc
- 4 Magnesium
- 5 Boron

**Column II**

- P. Maintenance of ribosomal constitution.
- Q. Carbohydrate transport
- R. Nitrogen fixation
- S. Activity of enzymes in respiration
- T. Auxin synthesis

- (a) 1 - S, 2 - R, 3 - P, 4 - Q, 5 - T
- (b) 1 - S, 2 - R, 3 - T, 4 - P, 5 - Q
- (c) 1 - R, 2 - P, 3 - S, 4 - T, 5 - Q
- (d) 1 - T, 2 - S, 3 - Q, 4 - R, 5 - P

42. Which one is correct option for Column I and Column II

**Column I**

- 1 Diffusion
- 2 Ion exchange
- 3 Donnan Equilibrium
- 4 Principle of Mass flow
- 5 Active absorption

**Column II**

- (i) Suction pressure
- (ii) expenditure of metabolic energy
- (iii) Cell wall
- (iv) ion channels
- (v) plasma membrane

- (a) 1 - iv, 2 - iii, 3 - v, 4 - i, 5 - ii
- (b) 1 - ii, 2 - iii, 3 - iv, 4 - v, 5 - i
- (c) 1 - iv, 2 - iii, 3 - v, 4 - ii, 5 - i
- (d) 1 - v, 2 - i, 3 - ii, 4 - iii, 5 - iv

43. The absorption, distribution and metabolism of various mineral elements is called .....

- (a) dispersal of mineral
- (b) Absorption of mineral salts
- (c) mineral metabolism
- (d) mineral nutrition

44. Elements and its deficiency symptoms are given in Column I and Column II

**Column I**

- 1 P
- 2 Cl
- 3 Mo
- 4 B
- 5 S

**Column II**

- a. Accumulation of purple pigments.
- b. discolored tubers and roots.
- c. Wilting of stubby roots.
- d. Pale green leaves with rolled margins.
- e. purple blots occur on leaf surface.

- (A) 1- a, 2 - d, 3 - b, 4 - c, 5 - e
- (B) 1- d, 2 - c, 3 - a, 4 - b, 5 - e
- (C) 1- e, 2 - c, 3 - d, 4 - b, 5 - a
- (D) 1- e, 2 - c, 3 - b, 4 - d, 5 - a

45. Which are criteria for Essentiality of Elements.

Choose the correct sentences from given sentences.

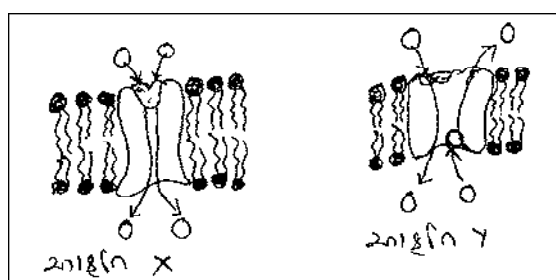
- (i) A plant must be unable to complete its life cycle in the absence of the mineral element.
- (ii) The function of the element must not be replaceable by another mineral element.
- (iii) All minerals which are absorbed by plants are not essential minerals.

- (a) i and ii
- (b) iii and i
- (c) ii and iii
- (d) only ii

46. In the following statements which option is correct for toxicity levels of elements.  
 Statements :  
 (A) Toxicity levels for any elements may inhibit the uptake of another element.  
 (B) Low concentration of Mn may cause deficiencies of Mg and Ca.  
 (C) A moderate increase toxicity are difficult to identify.  
 (a) A                      (b) A and C                      (c) all                      (d) B and C
47. Which is the correct path of transport of mineral nutrients from roots ?  
 (a) Root epidermal layer → endodermis → cortex → Pericycle → xylem tissue  
 (b) Root epidermal layer → cortex → endodermis → xylem tissue → Pericycle  
 (c) Root epidermal layer → cortex → endodermis → Pericycle → xylem tissue  
 (d) Root epidermal layer → Pericycle → cortex → endodermis → xylem tissue
48. From the given statements for transport of mineral elements which are correct one ?  
 (i) Transport of mineral ions takes place by symplastic and Apoplastic path.  
 (ii) Mineral ions absorbed by roots first enters in the cortex then through pericycle and endoder mis enters into xylem units.  
 (iii) Water and mineral ion transpotation are interlinked with each other.  
 (iv) Transport of mineral elements in xylem takes place with water only.  
 (a) i, ii and iii                      (b) i, iii and iv                      (c) ii, iii and iv                      (d) i and ii
49. Match proper pair
- | Column I                       | Column II                      |
|--------------------------------|--------------------------------|
| 1 Silt particle                | a. large                       |
| 2 Sand particle                | b. Colloids                    |
| 3 Clay particle                | c. medium                      |
| 4. very small clay particle    | d. small                       |
| (A) 1 - a, 2 - d, 3 - c, 4 - b | (B) 1 - b, 2 - c, 3 - a, 4 - d |
| (C) 1 - c, 2 - b, 3 - d, 4 - a | (D) 1 - c, 2 - a, 3 - d, 4 - b |
50. Write an example of bacteria and the process which is responsible for reducing nitrates to gaseous nitrogen ?  
 (a) Agrobacterium and Nitrification  
 (b) Pseudomonas and Agrobacterium  
 (c) Nitrosomonas and Denitrification  
 (d) Agrobacterium and Denitrification
51. The method of hydroponic in which with the use of NFT, automatically, nutrient rich solution is given, is called .....
- (a) Continous flowing solution culture  
 (b) Tissue culture method  
 (c) Gas culture method  
 (d) Balanced - culture solution method



52. Which type of transport of mineral elements is shown in the given diagram ?



- |  |   |
|--|---|
| <p>(a) Fig x Symport</p> <p>(b) Fig x Unipart</p> <p>(c) Fig x Symport</p> <p>(d) Fig x Antipart</p> | <p>Fig y Unipart</p> <p>Fig y Antipart</p> <p>Fig y Antipart</p> <p>Fig y symport</p> |
|--|---|
53. Which is the correct sequence of enzymes for protein synthesis during  $N_2$  fixation ?
- (a) Nitrogenase → Transaminase → Glutamate dehydrogenase  
 (b) Glutamate dehydrogenase → Transaminase → Nitrogenase  
 (c) Hydrogenase → Glutamate dehydrogenase → Transaminase  
 (d) Transaminase → Nitrogenase → Glutamate dehydrogenase
54. Which amino acid acts as a main donor of amino group in transamination ?
- (a) Glutamic acid                      (b) Glutamine  
 (c) Glutamate dehydrogenase      (d) Glycine
55. The region within the plasma membrane and within the vacuole is called ?
- (a) nucleus membrane region                      (b) passive transport region  
 (c) Cellular region                                      (d) Active transport region
56. What is responsible for  $N_2$  fixation in Rhizobium ?
- (a) nif - gene                      (b) leghemoglobin                      (c) Nitrogenase                      (d) ATP
57. Which of the following is not related with intra cellular fluid ?
- (a) Mn                                      (b) Mg                                      (c) Mo                                      (d) Na
58. Which method of hydroponics used for raising plants in solution filled containers such as a glass, jars, buckets, tubs and water tanks ?
- (a) static solution culture                                      (b) nutrient film technique  
 (c) Aeroponics    (d) tissue culture
59. Which is improper pair of the following ?
- (a) Ionic balance in plants - Na                                      (b) Cell wall component - B  
 (c) Activation of Nitrogenase - Cu                                      (d) Required for iron absorption - Ni
60. Which is proper pair of ions and its deficiency symptoms ?
- (a) Nitrogen - Induction of dormancy                                      (b) Potassium - Scorched look to leaves  
 (c) Phosphorous - Chlorosis    (d) Zinc - Brown spotted of fruit

61. Which is correct for absorption of mineral ions, from the given statement ? select proper option.  
 (i) Elements absorbed by root cells first enters region between cell wall and plasma membrane.  
 (ii) It also enters in the inter cellular space of root cells.  
 (iii) This process occurs rapidly through transportation and requires energy obtained from ATP.  
 (iv) Later on mineral ions enters inside plasma membrane and vacuolar sap.  
 (a) i, ii and iii                      (b) i and ii  
 (c) iii and iv                        (d) i, ii and iv
62. Find out the correct option from the given statements for ion exchange.  
 (i) Anion and cations are located on the surface of cell wall through their absorption.  
 (ii) The soil solutions also contains ions.  
 (iii) Carrier molecules are involved in ion exchange & energy is consumed from ATP.  
 (iv) Such ionic exchange occurs even against their concentration - gradient.  
 (a) iii and iv                      (b) i, ii and iii                      (c) i, ii and iv                      (d) ii, iii and iv
63. Which statement is correct option from the given statements for plasma membrane ?  
 (i) The inner region of plasma membrane is the region within the vacuole.  
 (ii) For ionic absorption various ionic channels are located in the plasma membrane.  
 (iii) In Donnan equilibrium, only positive ions occurs on the inner surface of plasma membrane  
 (a) only ii                          (b) i and ii  
 (c) ii and iii                      (d) i, ii and iii
64. Which one is the correct statement from the given statements for Nitrogen cycle ?  
 (i) Amonification is the transforming process of complex organic matters into the simple organic matters.  
 (ii) Nostoc converting the gaseous  $N_2$  in to  $NO_2^-$   
 (iii) Agrobacterium converted directly from  $NO_3^-$  to  $N_2$ .  
 (iv) Psuedomonas converts  $NO_3^-$  into gaseous  $N_2$ .  
 (a) i and ii                      (b) only iv  
 (c) i, ii and iii                      (d) ii and iv
65. Select improper pair for the  $N_2$  fixation to the formation of Amino acid process.  
 (a) FAD - Reduction inducing unit  
 (b) Essential enzymes - Hydrogenase, Nitrogenase  
 (c) ATP - the introduction of  $H_2$  units in a diatomic  $N_2$  unit.  
 (d) Reductive Amination - Nitrogenase.
66. Choose in correct pair.  
 (a) Pulses - Nostoc  
 (b) Nitrogenase - iron & molybdenum containing protein.  
 (c) leghemoglobin - Oxygen carries protein.  
 (d) FAD - Floride Adenine Dinucleotide.

67. Amonification is the release of  $\text{NH}_3$  after the death of plants and animals and their degradation. Find the mistake in the given statement.
- (a) Conversion of  $\text{NH}_3$  into  $\text{NO}_2^-$  and  $\text{NO}_3^-$  is not mentioned.
  - (b) Excretory substances of dead bodies is not mentioned.
  - (c) Microbes responsible for degradation in the process are not mentioned.
  - (d) Release of  $\text{NH}_3$  from  $\text{N}_2$  containing substances (denitrification) is not mentioned.
68. Which is correct statement for Active transport ?
- (a) It occurs in the concentration gradient so ATP is not required.
  - (b) It occurs in the concentration gradient so ATP is required.
  - (c) It occurs against the concentration gradient so ATP is not required.
  - (d) It occurs against the concentration gradient so ATP is required.
69. Which is the true statement for the vanadium element ?
- (a) deficiency do not regulate the size of stomata.
  - (b) It is united in the formation of bipolar spindle during cell division.
  - (c) plant do not get ammonia from the soil, due to its deficiency.
  - (d) It plays role as structural component of vitamin Biotin and thiamin.
71. Of the following, S is essential for best production of which crop ?
- (a) oily seeds                      (b) leguminosae                      (c) grains                      (d) Fibres
72. By which nitrite is converted into nitrate ?
- (a) Nitro bacter                      (b) Nitro somonas                      (c) Agro bacterium                      (d) Psuedomonas



**ANSWER KEY**

1	d	26	c	51	a
2	a	27	c	52	c
3	b	28	d	53	c
4	c	29	d	54	a
5	c	30	b	55	c
6	d	31	b	56	a
7	a	32	a	57	b
8	a	33	c	58	a
9	b	34	d	59	c
10	c	35	a	60	b
11	d	36	c	61	d
12	d	37	b	62	c
13	a	38	a	63	c
14	b	39	d	64	b
15	c	40	c	65	d
16	a	41	b	66	c
17	d	42	a	67	c
18	a	43	d	68	d
19	d	44	c	69	c
20	b	45	d	70	a
21	d	46	a	71	b
22	c	47	c	72	a
23	c	48	b		
24	a	49	d		
25	a	50	d		



## Unit -IV

### Chapter-16. Photosynthesis

#### IMPORTANT POINTS

Green plants make their own food by photosynthesis. During this process carbon dioxide from the atmosphere is taken in by leaves through stomata and used for making carbohydrates, principally glucose and starch. Photosynthesis takes place only in the green parts of the plants, mainly the leaves. Within the leaves, the mesophyll cells have a large number of chloroplasts that are responsible for CO<sub>2</sub> fixation. Within the chloroplasts, the membranes are sites for the light reaction, while the chemosynthetic pathway occurs in the stroma. photosynthesis has two stages the light reaction and the carbon fixing reations. in the light reaction the light energy is absorbed by the pigments present in the antenna and funnelled to special chlorophyll a molecules called reaction centre chlorophylls there are two photosystems, PS I and PS II. PS I has a 700 nm absorbing chlorophyll a P700 molecule at its reaction center, while PS II has a P680 reaction centre that absorbs red loght at 680 nm After absorbing light, electrons are excited and transferred through PS II and PS I and finally to NAD forming NADH. during this process a proton gradient due to movement through the thylakoid The breakdown of the protons gradient due to movement through the F<sub>0</sub> part of the ATPase enzyme releases enough energy for synthesis of ATP splitting of water molecules is associated with PS II resulting in the release of O<sub>2</sub>, protons and transfer of electrons to PS II In the carbon fixation cyale, CO<sub>2</sub> is added by the enzyme, RuBisCO, to a 5 carbon compound RuBP that is converted to 2 molecules of 3- carbon PGA. this is then converted to sugar by the Calvin cycle, and the RuBP is regenerated. During this process ATP and NADPH synthesised in the light reaction are utilised RuBisCO also catalyses a wasteful oxygenation reaction in C<sub>3</sub> plants: Photorespiration Some tropical plants show a special type of photosynthesis called C<sub>4</sub> pathway in these plants the first product of CO<sub>2</sub> fixation that takes place in the mesophyll, is a 4-carbon compound. in the bundle sheath cells the Calvin pathway is carried out for the synthesis of carbohydrates.

- The name Melvin Calvin is associated with
  - synthesis of ATP during photosynthesis
  - release of water during photosynthesis
  - carbon fixation during photosynthesis
  - capture light energy during photosynthesis
- Who gave chemical compositions of chlorophyll and carotenoids ?
 

(A) Park and Biggins	(B) Meyers and French
(C) Willstatter and Stahi	(D) Arnon and Benson
- The non-polar part of chlorophyll is
 

(A) phytol	(B) porphyrin	(C) pyrrol	(D) none above
------------	---------------	------------	----------------

4. The approximate dimension of chlorophyll porphyrin ring is.  
(A) 1 A° square (B) 5 A° square (C) 10 A° square (D) 15 A° square
5. Photosynthesis is most active in  
(A) sunlight (B) yellow (C) red (D) green
6. Intensity of light increase 20 times, rate of photosynthesis will  
(A) increase (B) not increase  
(C) decrease (D) increase till feed back inhibition.
7. Out of the total light energy that is available for plants is  
(A) 50 % (B) 75 % (C) 25 % (D) 1—2%
8. One photon is blue light contains....kcal and of red light....kcal  
(A) 70 ; 40 (B) 220 ; 70 (C) 10 ; 90 (D) 90 ; 10
9. The most efficient convertor of sunlight is  
(A) Potato (B) Tomato (C) Sugar cane (D) Papaya
10. Cyclic photophosphorylation is confined to  
(A) Photosystem I (B) Photosystem II  
(C) both a & b (D) none above
11. For synthesis of one gram of hexose, the land plant consumes.  
(A) Only 1/3 of the CO<sub>2</sub> of air (B) Only 1/4 of the CO<sub>2</sub> of air  
(C) Only 2/3 of the CO<sub>2</sub> of air (D) none of the above
12. For synthesis of one glucose molecule, the number of ATP required are  
(A) 9 ATP for C<sub>3</sub> cycle and 20 ATP for C<sub>4</sub> cycle  
(B) 18 ATP for C<sub>3</sub> cycle and 30 ATP for C<sub>4</sub> cycle  
(C) 22 ATP for C<sub>3</sub> cycle and 35 ATP for C<sub>4</sub> cycle  
(D) 24 ATP for C<sub>3</sub> cycle and 36 ATP for C<sub>4</sub> cycle
13. The volume of O<sub>2</sub> liberated in photosynthesis has the following ratio to CO<sub>2</sub>.  
(A) O<sub>2</sub>/CO<sub>2</sub> = 1 (B) O<sub>2</sub>/CO<sub>2</sub> = 1/2  
(C) O<sub>2</sub>/CO<sub>2</sub> = 2/1 (D) O<sub>2</sub>/CO<sub>2</sub> = 3/1
14. The inhibiting effect of oxygen in C<sub>3</sub> plants on photosynthesis is  
(A) solarization (B) photooxidation  
(C) Warbug's effect (D) none above
15. Pick up C<sub>4</sub> plant.  
(A) Papaya (B) Potato (C) Maize (D) Pea
16. It is advantageous to use a water plant to demonstrate photosynthesis other than a land plant because.  
(A) it photosynthesize rapidly (B) it respire slowly  
(C) it does not transpire (D) O<sub>2</sub> bubbles from cut and can be collected over H<sub>2</sub>O.
17. For chlorophyll formation most important are  
(A) Fe<sup>++</sup> and Ca<sup>++</sup> (B) Fe<sup>++</sup> and Mg<sup>++</sup> (C) Mg<sup>++</sup> and Ca<sup>++</sup> (D) all the above

18. Translocation of sugar in angiosperms occur in form of  
 (A) glucose      (B) starch      (C) lactose      (D) sucrose
19.  $Q_{10}$  is  
 (A) respiratory coefficients      (B) photosynthetic coefficient  
 (C) photosynthetic yield      (D) temperature coefficient
20. Photorespiration is favoured by  
 (A) low temperatures      (B) low light intensity  
 (C) high  $O_2$  and low  $CO_2$       (D) low  $O_2$  and high  $CO_2$
21. Quinones are  
 (A) mobile electron carriers      (B) enzymes of oxidative phosphorylation  
 (C) enzymes of krebs cycle      (D) none of the above
22. During dark reaction, for the fixation of carbon, the three carbon atoms of each molecule of 3 – phosphoglyceric acid (PGA) are derived from  
 (A) RuBP only      (B)  $CO_2$  only  
 (C) RuBP +  $CO_2$       (D) RuBP +  $CO_2$  + PEP.
23. Calvin cycle utilize for fixation of 3 molecules of  $CO_2$   
 (A) 9 ATP and 6  $NADPH_2$       (B) 8 ATP and 8  $NADPH_2$   
 (C) 9 ATP and 3  $NADPH_2$       (D) 6 ATP and 6  $NADPH_2$
24. Chloroplast has maximum quantity of...in stroma  
 (A) dehydrogenase      (B) RuBP carboxylase  
 (C) pyruvic carboxylase      (D) hexokinase
25. If thylakoids are removed and kept in culture medium having  $CO_2$  and  $H_2O$  and exposed to light ; they cannot form hexose sugars as end product because.  
 (A) light trapping device absent      (B) pigments P-700 and P-680 not linked  
 (C)  $CO_2$  assimilating enzymes absent      (D)  $CO_2$  assimilation cannot occur in light
26. Which of the following plant is efficient converter of solar energy whose net productivity 2-4 kg/m<sup>2</sup>/yr or even higher.  
 (A) Wheat      (B) rice      (C) sugarcane      (D) bajra
27. The number of photons required to release one mole of  $O_2$  in photosynthesis called.  
 (A) quantum yield      (B) quantum requirement  
 (C) red drop      (D) Emerson's effect
28. Calvin cycle represents one of the following phenomenon.  
 (A) oxidative carboxylation      (B) dark phosphorylation  
 (C) dark respiration      (D) reductive carboxylation
29. Hill reaction takes place  
 (A) in the absence of  $CO_2$   
 (B) in the presence of carbon dioxide  
 (C) in the absence of a suitable electron acceptor  
 (D) none above

30. Match the names of scientists given under Column – I with their important contributions given under Column – II ; choose the answer which gives correct combination of the alphabets :

**Column – I(Scientists)**

**Column – II(Contributions)**

- |                   |   |
|-------------------|---|
| P. Peter Mitchell | (i) Steps of dark reaction of photosynthesis. |
| Q. J.W. Gibbs     | (ii) Photosynthetic phosphorylation           |
| R. Daniel Arnon   | (iii) Concept of free energy                  |
| S. Melvin Calvin  | (iv) Chemiosmotic hypothesis                  |
|                   | (v) Mass flow hypothesis                      |

- (a) P = (iv), Q = (iii), R = (ii), S = (i)  
 (b) P = (iii), Q = (iv), R = (i), S = (i)  
 (c) P = (iv), Q = (v), R = (iii), S = (ii)  
 (d) P = (iv), Q = (iii), R = (i), S = (ii)

31. Match Column – I with given under Column – II ; choose the answer which gives correct combination:

**Column – I(Scientists)**

**Column – II(Contributions)**

- |  |                      |
|--|----------------------|
| P. A pigment which absorbs red and far-red light                       | (i) Cytochrome       |
| Q. Main pigment involved in transfer of electrons in photosynthesis is | (ii) PEP carboxylase |
| R. NADPH <sub>2</sub> is generated through...                          | (iii) Photochrome    |
| S. Enzyme which fixes CO <sub>2</sub> in C <sub>4</sub> plants         | (iv) Photosystems    |

- (a) P = (i), Q = (ii), R = (iii), S = (iv)  
 (b) P = (iii), Q = (i), R = (iv), S = (iii)  
 (c) P = (iii), Q = (ii), R = (iii), S = (i)  
 (d) P = (i), Q = (ii), R = (iv), S = (iii)

32. The basic feature of typical C<sub>4</sub> plants showing 'Kranz' anatomy is

- (A) the presence of chloroplasts in mesophyll and epidermal cells  
 (B) the presence of chloroplasts in bundle sheath cells  
 (C) the presence of rudimentary chloroplasts in bundle sheath cells and typical chloroplasts with well-formed grana in mesophyll cells  
 (D) the presence of typical chloroplasts with well-formed grana in bundle sheath cells and rudimentary chloroplasts in the mesophyll cells

33. A. Six turns of Calvin-cycle result in the production of one molecule of glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)

R. Three molecules of ribulose 1, 5 – bisphosphate (Ru BP) react with three molecules of carbon dioxide to produce six carbon intermediates.

- (A) A is correct and R is its explanation      (B) A is correct but R is not its explanation  
 (C) A is correct but R is wrong                      (D) Both A and R are wrong

34. Maximum photosynthesis occurs in which of these lights ?

- (A) Red    (B) Green  
 (C) Very high light    (D) Continuous bright light

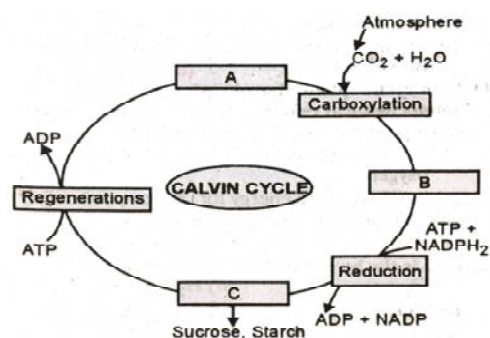


35. In  $C_4$  plants showing Kranz anatomy which of the following is correct ?  
 (A) Bundle sheath cells without grana and mesophyll cells with grana  
 (B) bundle sheath cells with grana mesophyll cells without grana  
 (C) both are without grana  
 (D) both are with grana
36. In Blackmann's 'Law of Limiting Factors' the rate of photosynthesis continues to increase with the successive increase in the amounts of  
 (A) carbon dioxide, light, temperature      (B) temperature, light, carbon dioxide  
 (C) light, temperature, carbon dioxide      (D) light, carbon dioxide, temperature
37. Choose the correct statement  
 (A) Chl a is blue green pigment with formula  $C_{55}H_{70}O_6N_4Mg$   
 (B) Chl a is blue green pigment with formula  $C_{55}H_{72}O_5N_4Mg$   
 (C) Chl b is yellow green pigment with formula  $C_{55}H_{70}O_5N_4Mg$   
 (D) Xanthophyll is pigment with formula  $C_{40}H_{60}$
38. Chlorophyll a is absent in which of the following photosynthesising organisms ?  
 (A) Bacteria      (B) Cyanobacteria      (C) Red algae      (D) Brown algae
39. Photorespiration in  $C_3$  plants starts from.  
 (A) phosphoglycerate      (B) phosphoglycolate      (C) glycerate      (D) glycine
40. Which one of the following is wrong in relation to photorespiration ? It  
 (A) occurs in chloroplasts      (B) occurs in daytime only  
 (C) is a characteristic of  $C_4$  plants      (D) is a characteristic of  $C_3$  plants
41. In sugarcane plant  $CO_2$  is fixed in malic acid, in which the enzyme that fixes  $CO_2$  is  
 (A) ribulose biphosphate carboxylase      (B) phosphoenol pyruvic acid carboxylase  
 (C) ribolose phosphate kinase      (D) fructose phosphatase
42. Plants are removed from patients room at night because  
 (A) they produce  $CO_2$  at night in more concentration  
 (B) they produce  $CO_2$  all the time but release  $O_2$  also in day time  
 (C) they consume  $O_2$  at night.  
 (D) they do not photosynthesize at night, therefore fail to deplete  $CO_2$  of the room, hence their presence will increase  $CO_2$
43. Who is that scientist who gave the Law of limiting factors ?  
 (A) Blackman      (B) Hill      (C) Liebig      (D) Von Mohi
44. Which of the following is correct for chlorophyll of cyanobacteria ?  
 (A) Chl a =  $C_{55}H_{70}O_6N_4Mg$       (B) Chl a =  $C_{55}H_{72}O_5N_4Mg$   
 (C) Chl b =  $C_{55}H_{72}O_6N_4Mg$       (D) Xanthophyll =  $C_{40}H_{56}$
45. How many electrons are involved for the formation of 1 mole of glucose and  $6O_2$  molecules ?  
 (A) 6      (B) 12      (C) 18      (D) 24

46. A. The atmospheric concentration of  $\text{CO}_2$  at which photosynthesis just compensation point.  
 R. The  $\text{CO}_2$  compensation point is reached when the amount of  $\text{CO}_2$  uptake is less than that generated through respiration because the level of  $\text{CO}_2$  in the atmosphere is more than that required for achieving  $\text{CO}_2$  compensation point.  
 (A) If A is correct and R is its explanation (B) If A is correct but R is not its explanation  
 (C) If A is correct but R is wrong (D) If both A and R are correct
47. Choose the correct statement.  
 (A) The  $\text{C}_4$  plants do not have Rubisco.  
 (B) Carboxylation of RuBP leads to the formation of PGA and phosphoglycolate.  
 (C) Decarboxylation of  $\text{C}_4$  acids occurs in the mesophyll cells.  
 (D) In CAM plants Calvin's cycle reactions occur during night.
48. Match the names of scientists given under Column – I with their important contributions given under Column – II ; choose the answer which gives correct combination of the alphabets :
- | Column – I(Scientists)  | Column – II(Contributions)           |
|-------------------------|--------------------------------------|
| P. Peter Mitchell       | (i) Law of limiting factor           |
| Q. Blackmann            | (ii) Dark reaction                   |
| R. Daniel Arnon         | (iii) Photosynthetic phosphorylation |
| S. Melvin Calvin        | (iv) Chemiosmotic hypothesis         |
| t. Mass flow hypothesis |                                      |
- (A) P = (iv) Q = (i) R = (iii) S = (ii)  
 (B) P = (i) Q = (iv) R = (ii) S = (iii)  
 (C) P = (ii) Q = (i) R = (iii) S = (iv)  
 (D) P = (iv) Q = (iii) R = (ii) S = (i)
49. Match the following with correct combination
- |                        |                       |
|------------------------|-----------------------|
| P. Carboxylation       | (i). Oxygen evolution |
| Q. Phosphorylation     | (ii) Photorespiration |
| R. Photolysis of water | (iii) Rubisco         |
| S. Phosphoglycolate    | (iv) Chemosynthesis   |
| T. Nitrosomonas        | (v)ATP                |
- (A) P = (i) Q = (ii) R = (iii) S = (iv) T = (v)  
 (B) P = (iii) Q = (v) R = (i) S = (ii) T = (iv)  
 (C) P = (i) Q = (iii) R = (v) S = (iv) T = (i)  
 (D) P = (i) Q = (iii) R = (iv) S = (ii) T = (v)
50. During photosynthesis, plants  
 (A) absorb  $\text{O}_2$ , release  $\text{CO}_2$  (B) release  $\text{O}_2$ , absorb  $\text{CO}_2$   
 (C) absorb  $\text{N}_2$ , release  $\text{O}_2$  (D) absorb  $\text{N}_2$  and release  $\text{NH}_3$

51. A plant with low CO<sub>2</sub> compensation point is  
 (A) *Atriplex patula* (B) *Leucopoa kingii*  
 (C) *Gossypium hisrsutum* (D) *Tidestromia oblingifolia*
52. Rubisco is an enzyme for  
 (A) CO<sub>2</sub> fixation in dark reaction (B) photorespiration  
 (C) regeneration of RuBP (D) photolysis of water
53. Photosynthesis in C<sub>4</sub> plants is relatively less limited by atmospheric CO<sub>2</sub> levels because :  
 (A) Four carbon acids are the primary initial CO<sub>2</sub> fixation production.  
 (B) The primary fixation of CO<sub>2</sub> is mediated via PEP carboxalase.  
 (C) Effective pumping of CO<sub>2</sub> into bundlesheath cells.  
 (D) Rubisco in C<sub>4</sub> plants has higher affinity for CO<sub>2</sub>.
54. Stomata of CAM plants  
 (A) are always open  
 (B) open during the day and close at night.  
 (C) open during the night and close during the day.  
 (D) never open
55. The Calvin cycle proceeds in three stages  
 1. reduction, during which carbohydrate is formed at the expense of the photochemically made ATP and NADPH  
 2. regeneration, during which the carbon dioxide acceptor ribulose – 1, 5 – biphosphate is formed  
 3. carboxylation, during which carbon dioxide combines with ribulose – 1, 5 - biophosphate  
 (A) 3-1-2 (B) 3-2-1 (C) 1-2-3 (D) 2-1-3
56. A. Under conditions of high light intensity and limited CO<sub>2</sub> supply, photorespiration has a useful role in protecting the plants from photo-oxidative damage.  
 R. If enough CO<sub>2</sub> is not available to utilize light energy for carboxylation to proceed, the excess energy may not cause damage to plants.  
 (A) If Assertion (A) and reason (R) both are correct and R is explanation to A.  
 (B) If (A) and (R) both are correct but (R) is not an explanation to A.  
 (C) If A is true but R is false.  
 (D) If both A and R are false.
57. A. Photosynthetically C<sub>4</sub> plants are less efficient than C<sub>3</sub> plants.  
 R. The operation of C<sub>4</sub> pathway requires the involvement of only bundle-sheath cells.  
 (A) If Assertion (A) and reason (R) both are correct and R is explanation to A.  
 (B) If (A) and (R) both are correct but (R) is not an explanation to A.  
 (C) If A is true but R is false.  
 (D) If both A and R are false.
58. One of the following is electron donor to P<sub>680</sub> during light reactions of photosynthesis.  
 (A) NADPH (B) Phytochrome  
 (C) Chlorophyll (D) Water

59. The requirement of assimilatory power to fix 6 molecules of  $\text{CO}_2$  is  
 (A) 6 ATP, 6 NADPH (B) 12 ATP, 18 NADPH  
 (C) 18 ATP, 18 NADPH (D) 18 ATP, 12 NADPH
60. Photorespiration and photosynthesis both require  
 (A) Organic fuel (B) chlorophyll (C) cytochromes (D) energy
61. The chemical structure of chlorophyll 'a' varies from chlorophyll 'b' due to difference between.  
 (A)  $\text{CH}_3$  and  $\text{C}_2\text{H}_5$  (B)  $\text{CH}_3$  and  $\text{CH}_2 = \text{CH}_2$   
 (C)  $\text{CH}_3$  and  $\text{CHO}$  (D)  $\text{CHO}$  and  $\text{CH}_2 = \text{CH}_2$
62. Choose the correct combinations of labelling the carbohydrate molecule involved in the Calvin cycle.  
 (A) A – RuBP, B – Triose phosphate C– PGA  
 (B) A – PGA, B – RuBP, C Triose phosphate  
 (C) A – RuBP, B – Triose phosphate, C – PGAL  
 (D) A – RuBP, B – PGAL, C – Triose phosphate
63. Chlorophyll molecules absorb light energy of wavelength  
 (A) 300-400 nm (B) 400-500 nm  
 (C) 600-800 nm (D) 400-500 nm and 600-700 nm
64. The reduction of ADP to ATP occurs by  
 (A) oxidation of water  
 (B) high conc. of  $\text{H}^+$  ions across the membrane  
 (C) oxidation of NADPH  
 (D) release of electron from PS-II to PS-I
65. The process of ATP formation from ADP in the presence of light in chloroplast is called  
 (A) phosphorylation  
 (B) autophosphorylation  
 (C) photophosphorylation  
 (D) chemophosphorylation
66. Photolysis of each water molecule in light reaction will yield  
 (A) 2 electrons and 4 protons (B) 4 electrons and 4 protons  
 (C) 4 electrons and 2 protons (D) 2 electrons and 2 protons
67. The enzyme pair common to  $\text{C}_3$  plants and EMP is  
 (A) cytochrome oxidase and enolase  
 (B) aldolase and triose phosphate isomerase  
 (C) aldolase and enolase  
 (D) phosphoglyceromutase and triose phosphate isomerase



68. Non-cycle photophosphorylation is the main photochemical reaction in green plants because  
 (A) it produces assimilatory power and oxygen  
 (B) it initiates photolysis of water and production of oxygen  
 (C) it utilizes more energy for oxygen production.  
 (D) there is no other cycle available.
69. .... is the by product of photosynthesis.  
 (A)  $O_2$                       (B)  $H_2O$                       (C)  $CO_2$                       (D)  $C_6H_{12}O_6$
70. Site of reduction of carbon is  
 (A) lamellae                      (B) thylakoid                      (C) grana                      (D) stroma
71. In  $C_4$  plants, the primary  $CO_2$  acceptor is  
 (A) 3 - PGA                      (B) Oxalo acetic acid                      (C) RuBP                      (D) PEP
72. It is estimated that about 85% of the earth's photosynthetic activity is carried out by  
 (A) trees                      (B) savannas  
 (C) phytoplanktons                      (D) herbaceous plants
73. In an experiment demonstrating the evolution of oxygen in Hydrilla, Sodium bicarbonate is added to water in the experimental set-up. What would happen if all other conditions are favourable ?  
 (A) Amount of oxygen evolved decreases as carbon dioxide in water is absorbed by sodium bicarbonate.  
 (B) Amount of oxygen evolved increases as the availability of carbon dioxide increases  
 (C) Amount of oxygen evolved decreases as the availability of carbon dioxide increases  
 (D) Amount of oxygen evolved increases as carbon dioxide in water is absorbed by sodium bicarbonate
74. In  $C_4$  plants, the bundle sheath cells.  
 (A) have thin walls to facilitate gaseous exchange  
 (B) have large intercellular spaces  
 (C) are rich in PEP carboxylase  
 (D) have a high density of chloroplasts
75. In chlorophyll structure four pyrrole rings are united with Mg by their atoms of  
 (A) N                      (B) C                      (C) H                      (D) O
76. The fixation and reduction of  $CO_2$  occur in presence of  
 (A) ATP                      (B) ATP and NADPH  
 (C) NADPH, chlorophyll and water                      (D) ATP, NADPH and light
77. Sugar moves in phloem vessels as \_\_\_\_\_.  
 (a) cellulose                      (b) glucose                      (c) starch                      (d) sucrose
78. \_\_\_\_ ions help in photolysis of water.  
 (a)  $Mn^{++}$                       (b)  $Mg^{++}$                       (c)  $Cl^-$                       (d) both (a) and (c)
79. RUBISCO enzyme is also called as \_\_\_\_\_.  
 (a) carboxy tetra mutase                      (b) carboxy di mutase  
 (c) carboxy tri mutase                      (d) carboxy uni mutase

80. \_\_\_\_\_ is precursor for abscissic acid (ABA)  
 (a) Zeatin (b) Lutein (c) Violaxanthin (d) Mevalonic acid
81. In young leaves ratio of carotene to Xanthophyll is \_\_\_\_\_.  
 (a) 2 : 1 (b) 3: 1 (c) 1: 3 (d) 1: 2
82. Which of the following pigments contains open pyrrole ring?  
 (a) Phycobilins (b) Xanthophylls (c) Chlorophylls (d)  $\alpha$ -carotene
83. In which of the following light, rate of photosynthesis is maximum?  
 (a) white (b) discontinuous white (c) red (d) blue
84. Quantum yield of photosynthesis is \_\_\_\_\_.  
 (a) 13.5 % (b) 8 % (c) 13% (d) 12.5%
85. During light phase of photosynthesis \_\_\_\_\_ is oxidized and \_\_\_\_\_ is reduced.  
 (a)  $\text{CO}_2$  and Water (b) Water and  $\text{CO}_2$   
 (c) Water and NADP (d)  $\text{NADPH}_2$  and  $\text{CO}_2$
86. During dark phase of photosynthesis \_\_\_\_\_ is oxidized and \_\_\_\_\_ is reduced  
 (a)  $\text{CO}_2$  and Water (b) Water and  $\text{CO}_2$   
 (c) Water and NADP (d)  $\text{NADPH}_2$  and  $\text{CO}_2$
87. The visible product of photosynthesis is \_\_\_\_\_.  
 (a) glucose (b) cellulose (c) starch (d) fructose
88. To produce 3 glucose molecules \_\_\_\_\_ ATP and \_\_\_\_\_  $\text{NADPH}_2$  molecules are required.  
 (a) 54, 36 (b) 54, 30 (c) 36, 60 (d) 18, 12
89. Glycolytic reversal is a part of \_\_\_\_\_.  
 (a) aerobic respiration (b) anaerobic respiration  
 (c) light phase of photosynthesis (d) dark phase of photosynthesis
90. RuBp carboxylase acts as RuBp carboxygenase at \_\_\_\_\_  $\text{CO}_2$  conc. And \_\_\_\_\_  $\text{O}_2$  conc.  
 (a) low, low (b) low, high (c) high, high (d) high, low
91. The source of  $\text{CO}_2$  during calvin cycle in  $\text{C}_4$  plant is  
 (a) Malic acid (b) OAA (c) PEP (d) RuBP
92. Dicot which follow  $\text{C}_4$  pathway is \_\_\_\_\_.  
 (a) wheat (b) Amranthus (c) Maize (d) Mango
93. Absorption spectrum of chlorophyll is maximum in \_\_\_\_\_ light.  
 (a) red (b) blue (c) yellow (d) blue-violet
94. The oxygen molecule in glucose formed during photosynthesis comes from  
 (a) Water (b) Organic acids (c)  $\text{CO}_2$  (d) atmosphere
95. Dimorphic chloroplast are present in \_\_\_\_\_.  
 (a) zea mays (b) sacchrum officinale (c) sorghum bicolor (d) all of these
96. Red pigment in tomato is  
 (a)  $\beta$ -carotene (b) Anthocyanin (c) Lycopene (d) Lutein

97. Solarisation refers to \_\_\_\_\_.  
 (a) formation of sugar with help of water and energy      (b) destruction of chlorophyll  
 (c) synthesis of chl.      (d) both b and c
98. Dark reaction requires light reaction for  
 (a) carboxylation of RUBP      (b) regeneration of RuBP  
 (c) reduction of PGA      (d) formation of hexose sugar
99. Emerson effect proves  
 (a) concept of two photosystem in plant      (b) photophosphorylation  
 (c) photorespiration      (d) there are light and dark reaction in photosynthesis
100. Name a plant which do not perform photosynthesis is  
 (a) Algae      (b) Bryophyllum      (c) cuscutta      (d) Pitcher plant
101. Light reaction of photosynthesis results in formation of \_\_\_\_\_.  
 (a) O<sup>2</sup>      (b) NADPH + H<sup>+</sup>      (c) ATP      (d) All of these
102. C<sub>55</sub>H<sub>70</sub>O<sub>6</sub>N<sub>4</sub>Mg is  
 (A) An accessory pigment in photosynthesis      (B) Present in PS-II  
 (C) Present in all green plants      (D) All of these
103. The ionized chl.a<sup>+</sup>  
 (A) Receives low energy electron      (B) Receives high energy electron  
 (C) Expels low energy electron      (D) Expels high energy electron
104. In Calvin cycle,  
 (A) fructose 1,6 diphosphate undergoes dephosphorylation.  
 (B) ATP is formed during dephosphoylation of fructose  
 (C) 1,3 diPGA undergo phosphorylation  
 (D) none of these
105. What will happen to the rate of photosynthesis if sodium bicarbonate is added in the water having hydrilla plant in a beaker  
 (A) It will remain normal      (B) It will be decreased  
 (C) It will be stopped      (D) It will be accelerated
106. Which of the following gas would disappear from the atmosphere if all the photosynthetic activities were to stop?  
 (A) Nitrogen      (B) Carbondioxide  
 (C) Hydrogen      (D) Oxygen
107. Photo-oxidation of chlorophyll and cell contents as a result of high light intensity is known as  
 (A) Solarization      (B) Photolysis  
 (C) Photoperiodism      (D) Photorespiration
108. Temperature is very high but a plant is showing photosynthesis with normal rate, probably it would be  
 (A) C<sub>3</sub> plant      (B) Mango plant      (C) Pea plant      (D) Sugarcane plant

109. For the process of photosynthesis all except one of the following items are essential. Point out the exception  
 (A) CO<sub>2</sub>, optimum temperature (B) Glucose and oxygen  
 (C) Water and minerals (D) Light and chlorophyll
110. The prerequisites of Calvins cycle are  
 (A) H<sub>2</sub>O, CO<sub>2</sub>, ATP (B) ATP, H<sub>2</sub>O, NADPH<sub>2</sub>  
 (C) CO<sub>2</sub>, ATP, NADPH<sub>2</sub> (D) NADPH<sub>2</sub>, H<sub>2</sub>O, CO<sub>2</sub>
111. In the calvin cycle, the assimilatory power is used during  
 (A) Formation of PGA  
 (B) Conversion of PGA to PGAL  
 (C) Formation of fructose 1-6 diphosphate from PGAL  
 (D) Formation of glucose from fructose – di- phosphate
112. Which is sensitive to longer wavelength of light?  
 (A) Photolysis (B) PSI (C) PS II (D) Photophosphorylation
113. In chrophyll structure Phytol tail is present at  
 (A) 3<sup>rd</sup> carbon of II<sup>nd</sup> ring (B) 2<sup>nd</sup> carbon of III<sup>rd</sup> ring  
 (C) 7<sup>th</sup> carbon of IV<sup>th</sup> ring (D) 3<sup>rd</sup> carbon of IV<sup>th</sup> ring
114. Reduction of co-enzyme NADP depends on  
 (A) Reduction of CO<sub>2</sub> (B) Evolution of O<sub>2</sub>  
 (C) Photolysis of water (D) Formation of ATP
115. Loculus is the internal space of  
 (A) Grana (B) Stroma (C) Thylakoid (D) Quantasome
116. Calvins cycle involves  
 (A) Oxidative phosphorylation (B) Oxidative carboxylation  
 (C) Reductive carboxylation (D) Reductive phophorylation
117. In C<sub>4</sub> plants, carboxylation is twice, it can be represented as  
 (A) Pyruvic acid + CO<sub>2</sub> and malic acid + CO<sub>2</sub>  
 (B) RuBP + CO<sub>2</sub> and pyruvic acid + CO<sub>2</sub>  
 (C) PEPA + CO<sub>2</sub> and RuBP + CO<sub>2</sub>  
 (D) PEPA + CO<sub>2</sub> and malic acid + CO<sub>2</sub>
118. In non-cyclic photophosphorylation, all the participants acts as electron donor and acceptor except  
 (A) Chl-a of PS I (B) Chl-a of PS II (C) NADP (D) Both (A) and (B)
119. Ribbon shaped chloroplast is present in  
 (A) Zygnema (B) Spirogyra  
 (C) Chlorobium (D) Chromatium
120. Which of the following protist is a photoautotroph  
 (A) Thiobacillus (B) Ferrobacillus  
 (C) Diatoms (D) Chlorobium



121. Photosynthesis takes place  
 (A) Only in green light (B) Only in sunlight  
 (C) In visible light obtained from any source (D) Only in high intensity of light
122. Chlorophyll-a differs from chlorophyll-b in having—  
 (A) Methyl group instead of aldehyde group  
 (B) Aldehyde group instead of methyl group  
 (C) Methyl group instead of ethyl group  
 (D) Only phytol tail instead of head
123. In non-cyclic photophosphorylation  
 (A) ATP is generated  
 (B) Both PSI and PSII are involved  
 (C) Electron flow is unidirectional  
 (D) All the above
124. In con-cyclic photophosphorylation, the electron emitted by  $P_{680}$  is replaced by electron from  
 (A) NADP (B) Water (C) Ferridoxin (D) Chlorophyll-a
125. 85-90% (9/10) of all photosynthesis in the world is carried out by  
 (A) Shrubs (B) Algae of the oceans  
 (C) Herbs (D) Scientists in the laboratory
126. Primary and secondary processes of Photosynthesis takes place in \_\_\_\_\_ and \_\_\_\_\_ respectively.  
 (A) Stroma and grana (B) Stroma and lamellae  
 (C) Thylakoid and quantasome (D) Grana and stroma
127. Which one occurs during both cyclic and non-cyclic photophosphorylation  
 (A) Formation of ATP (B) Release of  $O_2$   
 (C) Formation of  $NADPH_2$  (D) Involvement of both PSI and PSII
128. The photochemical process in photosynthesis which needs both PSI and PSII also involves  
 (A) Photolysis of water (B) Z-scheme of electron transfer  
 (C) Synthesis of assimilatory power (D) All of these
129. For synthesis of one molecule of glucose, the requirement of ATP and  $NADPH_2$  is respectively  
 (A) 15 and 10 (B) 12 and 8  
 (C) 30 and 15 (D) 18 and 12
130. Which of the following element is needed for chlorophyll biosynthesis?  
 (A) Copper (B) Magnesium  
 (C) Calcium (D) Chlorine
131. The two enzymes responsible for primary carboxylation in  $C_3$  and  $C_4$  pathway, respectively are  
 (A) RuBP carboxylase and RuBP oxygenase  
 (B) PEP carboxylase and RuBP carboxylase  
 (C) RuBP carboxylase and PEP carboxylase  
 (D) PEP carboxylase and pyruvate carboxylase

132. \_\_\_\_\_ are placed one above the other to form stack of coins  
 (A) oxysomes (B)  $F_1$  particles (C) cristae (D) thylakoids
133. Unidirectional flow of  $e^-$  in non-cyclic photophosphorylation is  
 (A)  $PSII \xrightarrow{e^-} PS-I \xrightarrow{e^-} NADP \xrightarrow{e^-} water$   
 (B)  $Water \xrightarrow{e^-} PS-II \xrightarrow{e^-} PS-I \xrightarrow{e^-} NADP$   
 (C)  $PSI \xrightarrow{e^-} NADP \xrightarrow{e^-} water \xrightarrow{e^-} PS II$   
 (D)  $Water \xrightarrow{e^-} PSI \xrightarrow{e^-} PSII \xrightarrow{e^-} NADP$
134. The head and tail of chlorophyll are made up of  
 (A) Pyrrole and tetrapyrrole (B) Porphyrine and phyrin  
 (C) Pophyrine and phytol (D) Tetrapyrrole and magnesium
135. The numbrer of photons needed for the evolution of one molecule of oxygen is  
 (A) 8 (B) 2 (C) 12 (D) 18
136. Action spectrum is  
 (A) A graph showing amount of light absorbed  
 (B) A graph showing rate of photosynthesis  
 (C) A graph showing absorption of light  
 (D) A graph showing amount of  $CO_2$  released
137.  $C_{40}H_{56}O_2$  is molecular formula of  
 (A) Xanthophyll (B) Carotenes  
 (C) Chlorophylls (D) Phycobillins
138. Quantasome contains  
 (A) 150-200 chlorophyll molecules (B) 200 chlorophyll molecules  
 (C) 230-250 chlorophyll molecules (D) 300-350 chlorophyll molecules
139. Erythrose monophosphate (4C) is formed during  
 (A) CAM pathway (B)  $C_4$  pathway  
 (C) Conversion of fructose to glucose (D) Regeneration of RuBP
140. Donor and acceptor of electrons is the same chlorophyll molecule in  
 (A) Cyclic phtophosphorylation (B) Photorespiration  
 (C) Substrate level phosphorylation (D) Non-cyclic photophosphorylation
141. If a photosynthsing plant releases  $O^{18}$ , it is concluded that the plant has been supplied with  
 (A) Water containing  $O^{18}$  (B) Oxygen in the form of ozone  
 (C) Sugar containing  $O^{18}$  (D) Carbon dioxide containing  $O^{18}$
142. Which of the following connet the primary and secondary processes of photosynthesis?  
 (A)  $NADPH_2$  (B) ATP and  $NADPH_2$   
 (C) ATP (D) Ferridoxins

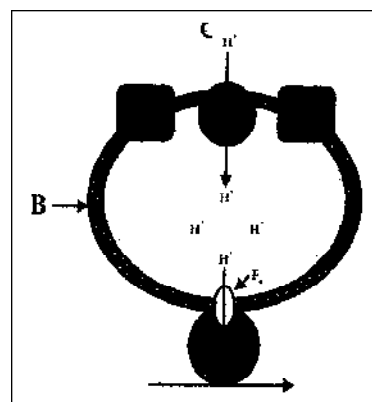
143.  $C_4$  plants can perform photosynthesis  
 (A) Even in low light intensity  
 (B) Even in low  $CO_2$  concentration  
 (C) Both (A) and (B)  
 (D) Only in high intensity of light and high  $CO_2$
144. In Hill's experiment, Hill used \_\_\_\_\_ as oxygen acceptor,  
 (A) Hydrogen (B) FAD (C) NADP (D) Haemoglobin
145. Fret channel is a another name for  
 (A) Stroma lamellae (B) Intergranal lamellae  
 (C) Grana lamellae (D) Space present in stroma lamellae
146. Bundle sheath chloroplast of  $C_4$  plants are  
 (A) Large and agranal (B) Large and granal  
 (C) Small and granal (D) Small and agranal
147. In  $C_3$  pathway, out of 12 molecules of 3-PGAL, how many are used for regeneration of RuBP?  
 (A) 12 (B) 8 (C) 10 (D) 6
148. A plant is kept in 300 ppm  $CO_2$  concentration. What will happen to it  
 (a) Plant will die soon  
 (b) Plant will grow but will not die  
 (c) Plant will show normal photosynthesis  
 (d) Respiration will be greatly decreased
149. All plastids have essentially same structure because  
 (a) They have to perform same function  
 (b) They are localized in aerial parts of plants  
 (c) All plastids store starch, lipid and proteins  
 (d) One type of plastid can be differentiated into another type of plastid depending on cell requirements
- 150 Give the correct name of indicated part A and B (CHART)

- (A) A- cytochrome-a &  $a_3$  B -Thylakoid  
 (B) A- Thylakoid B-cytochrome-a &  $a_3$   
 (C) A- cytochrome-b& f B-Thylakoid  
 (D) A- cytopalsm B-Thylakoid

- 151 which process is indicated by the given chart?

**Ple see fig. (QUE:150)**

- (A) Synthesis of ATP by chemiosmosis  
 (B) Synthesis of food by chemiosmosis  
 (C) hydrolysis of water by chemiosmosis  
 (D) transfer of electron by chemiosmosis



**ANSWER KEY**

1	C	26	C	51	A	76	B	101	D	126	D	150	C
2	C	27	B	52	B	77	D	102	D	127	A	151	A
3	A	28	D	53	B	78	D	103	A	128	D		
4	D	29	D	54	C	79	B	104	A	129	D		
5	A	30	A	55	A	80	C	105	D	130	B		
6	D	31	B	56	D	81	D	106	D	131	C		
7	A	32	C	57	D	82	A	107	A	132	D		
8	D	33	C	58	D	83	B	108	D	133	B		
9	C	34	A	59	D	84	D	109	B	134	C		
10	A	35	A	60	C	85	C	110	C	135	A		
11	B	36	A	61	C	86	D	111	B	136	B		
12	B	37	B	62	D	87	C	112	B	137	A		
13	A	38	A	63	A	88	A	113	C	138	C		
14	C	39	B	64	B	89	D	114	C	139	D		
15	C	40	C	65	C	90	B	115	C	140	A		
16	D	41	B	66	D	91	A	116	C	141	A		
17	B	42	B	67	B	92	B	117	C	142	B		
18	D	43	A	68	A	93	B	118	C	143	B		
19	D	44	B	69	A	94	C	119	B	144	D		
20	C	45	B	70	D	95	D	120	C	145	D		
21	A	46	C	71	D	96	C	121	C	146	A		
22	C	47	C	72	C	97	B	122	A	147	C		
23	A	48	A	73	D	98	C	123	D	148	C		
24	B	49	B	74	D	99	A	124	B	149	D		
25	C	50	B	75	A	100	D	125	B				

## Unit -IV

### Chapter-17. Respiration

#### IMPORTANT POINTS

- Important of Respiration in living organisms.  
The breakdown of C-C bonds of complex compounds through oxidation with in cell releasing considerable amount of energy is called respiration.
- Glycolysis : The breakdown of glucose to pyruvic acid is called glycolysis. This process occurs in the cytoplasm of cells.
- There are three major ways in which different cell handle pyruvic acid these are lactic acid fermentation, alcoholic fermentation and aerobic respiration.
- Aerobic respiration includes krebs cycle and oxidative phosphorylation in addition to glycolysis.
- All reaction of krebs cycle are carried out in the matrix of mitochondria and ETS (oxidative phosphorylation) carried out on inner membrane of mitochondria.
- Respiratory pathway is involved in both anabolic and catabolic processes and hence it is also known as an amphibolic pathway rather than as a catabolic one.
- During aerobic respiration  $O_2$  is consumed and  $CO_2$  is released. The ratio of  $CO_2$  to the  $O_2$  consumed during respiration is called Respiratory Quotient (RQ)

*For the given options select the correct options (a, b, c, d) each carries one mark.*

1. Respiration is (Grujarat GET Q.B.)
 

(a) Anabolic process	(b) Catabolic process
(c) Both a and b	(d) Endothermic process.
2. Metabolism involves
 

(a) Anabolic process	(b) Catabolic process
(c) Both a and b	(d) Only redox process
3. Organisms obtain energy through
 

(a) Reproduction	(b) Excretion	(c) Respiration	(d) Digestion
------------------	---------------	-----------------	---------------
4. Respiration is a
 

(a) Endergonic process	(b) Exergonic process
(c) Both A and B	(d) Neutralisation reaction
5. During respiration the food is
 

(a) Oxidised	(b) Reduced
(c) Both oxidised and reduced	(d) Neither oxidised nor reduced
6. Which of the following is a main respiratory substrate in animals
 

(a) Fructose	(b) Starch	(c) Glucose	(d) Proteins
--------------	------------	-------------	--------------

7. During the formation of ATP from ADP, which is released  
 (a) Water (b) Oxygen (c) Both A and B (d) Energy
8. Respiration is found in  
 (a) Bacteria (b) Prokaryotes (c) Only animals (d) All these
9. Respiratory substrate is completely oxidised in  
 (a) Aerobic respiration (b) Anaerobic' respiration.  
 (c) Both A and B (d) Fermentation
10. In which of the following types of respiration, the amount of energy released is comparatively more  
 (a) Aerobic respiration (b) Anaerobic respiration  
 (c) Equal energy is released in both A and B (d) None of these in correct
11. Fermentation occurs in the  
 (a) Presence of oxygen (b) Presence of water  
 (c) Absence of oxygen (d) Mitochondria
12. First stage in respiration is  
 (a) Glycolysis (b) Krebs cycle (c) ETS (d) Glycogenesis
13. Glucose is converted to pyruvic acid in  
 (a) Krebs cycle (b) C<sub>4</sub> cycle (c) C<sub>3</sub> cycle (d) Glycolysis.
14. Number of pyruvic acid molecules formed in glycolysis is (Gujarat GET Q.B.)  
 (a) 1 (b) 2 (c) 3 (d) 6
15. Number of carbons present in a pyruvic acid t molecule is  
 (a) 2 (b) 3 (c) 4 (d) 6
16. Glycolysis occurs in (Gujarat GET Q.B.)  
 (a) Cytoplasm (b) Mitochondria (c) Chloroplast (d) Golgi complex
17. Number of oxygen molecules used in glycolysis  
 (a) 12 (b) 4 (c) 6 (d) 0
18. Number of CO<sub>2</sub> molecules produced in glycolysis is  
 (a) 2 (b) 3 (c) 4 (d) 0
19. In respiration, final acceptor of protons is :  
 (a) Oxygen (b) NAD<sup>+</sup> (c) FAD (d) UQ
20. Which is not formed during anaerobic respiration ?  
 (a) Pyruvate (b) Ethyl alcohol (c) Acetyl CoA (d) CO<sub>2</sub>
21. ADP combines with inorganic phosphate (Pi) to give  
 (a) ATP (b) AMK (c) GDP (d) GTP
22. Dihydroxy acetone phosphate is a  
 (a) 2 C compound (b) 3 C compound (c) 4 C compound (d) 6 C compound
23. Number of ATPs consumed in glycolysis are  
 (a) 2 (b) 4 (c) 6 (d) 8

24. Substrate in glycolysis is normally  
 (a) Fructose (b) Glucose  
 (c) Pyruvic acid (d) Phosphoglyceric acid
25. Decarboxylation of pyruvic acid results in the formation of  
 (a) Water (b) Acetyl CoA (c) Glucose (d) PGA.
26. Number of direct ATPs produced in glycolysis is (Gujarat GET Q.B.)  
 (a) 2 (b) 4 (c) 6 (d) 1
27. Number of reduced coenzymes NADH produced during glycolysis are  
 (a) 1 (b) 2 (c) 4 (d) 6
28. Net gain of glycolysis is  
 (a) 3 ATP and 1 NADH + H<sup>+</sup> (b) 2 ATP and 2 NADH + H<sup>+</sup>  
 (c) 6 ATP and 4 NADH + H<sup>+</sup> (d) 10 ATP and 6 NADH + H<sup>+</sup>
29. In respiration, the oxygen is used in  
 (a) Glycolysis (b) Krebs cycle (c) ETS (d) Fermentation
30. One molecules of NADH + H<sup>+</sup> gives how many ATPs in ETS (Gujarat CETQ.B.)  
 (a) 2 ATP (b) 3 ATP (c) 4 ATP (d) 6 ATP
31. Conversion of pyruvic acid to acetyl Co A is called  
 (a) Glycolysis (b) Fermentation  
 (c) ETS (d) Oxidative decarboxylation
32. Reduction of acetaldehyde gives  
 (a) Methyl alcohol (b) Ethyl alcohol (c) Glycerol (d) All these
33. Lactic acid is formed due to the reduction of (Gujarat GET Q.B.)  
 (a) Pyruvic acid (b) Acetaldehyde (c) Malic acid (d) Acetyl CoA
34. Fermentation is the primary mode of energy production in  
 (a) Higher plants (b) Animals (c) Yeast (d) Algae.
35. Krebs cycle occurs in (Gujarat GET Q.B.)  
 (a) Cytoplasmic matrix (b) Mitochondrial matrix  
 (c) F<sub>1</sub> particles (d) All these
36. Krebs cycle is also known as  
 (a) Citric acid cycle (b) TCA cycle (c) Both a and b (d) Calvin cycle
37. The location of ETS is ;  
 (a) Mitochondria! matrix (b) Cytoplasm  
 (c) Outer mitochondrial membranes (d) Inner mitochondrial membrane
38. Krebs cycle starts with the condensation of acetyl CoA with  
 (a) Pyruvic acid (b) Oxalo-acetic acid (c) Malic acid (d) Citric acid
39. α - keto glutaric acid consists of  
 (a) 3 carbons (b) 4 carbons (c) 5 carbons (d) 6 carbons

40. Citric acid cycle was proposed by  
 (a) Krebs (b) Calvin (c) Mendel (d) Lavoisier
41. Direct synthesis of ATPs in one turn of Krebs cycle is  
 (a) 1 (b) 2 (c) 3 (d) 4
42. Number of  $\text{NADH}^+ \text{H}^+$ , formed in one turn of Krebs cycle is  
 (a) 2 (b) 4 (c) 6 (d) 5
43. Number of  $\text{FADH}_2$  formed in one turn of Krebs cycle is  
 (a) 1 (b) 2 (c) 3 (d) 4
44. Number of ATPs which can be generated by one  $\text{FADH}_2$  in ETS are (Gujarat GET Q.B.)  
 (a) 1 (b) 2 (c) 3 (d) 4
45. Formation of ATPs in mitochondria is known as  
 (a) Oxidative phosphorylation (b) Cyclic photophosphorylation  
 (c) Noncyclic photophosphorylation (d) Fermentation
46. Formation of ATP occurs  
 (a) In outer mitochondrial membrane (b) On  $\text{F}_1$  particles  
 (c) Mitochondrial matrix (d) In mitochondrial DNA
47. Phosphorylation means  
 (a) Formation of reduced coenzymes (b) Formation of PGA  
 (c) Formation of ATP (d) Breakdown of ATP
48. Oxidative phosphorylation occurs in  
 (a) Mitochondria (b) Chloroplast (c) Cytoplasm (d) Golgi bodies
49. The metal ion present in cytochromes is  
 (a) Copper (b) Iron (c) Magnesium (d) Zinc
50.  $\text{CO}_2$  release occurs in  
 (a) Photosynthesis (b) Respiration (c) Transpiration (d) Guttation
51. R.Q. stands for  
 (a) Reduction quotient (b) Respiratory quotient (c) Reverse quotient (d) None of these
52. R.Q. of carbohydrates is  
 (a) 1 (b) 2 (c) 3 (d) 4
53. R.Q. of anaerobic respiration is  
 (a) Zero (b) Infinity (c) Less than one (d) More than one
54. When amount of  $\text{CO}_2$  taken from atmosphere (in photosynthesis) becomes equal to the amount of  $\text{CO}_2$  released in atmosphere (in respiration), this is called  
 (a) Final point (b) Compensation point  
 (c) Balance point (d) Equal distribution
55. Alternative pathway for respiration is  
 (a) Photorespiration (b) Pentose phosphate pathway  
 (c)  $\text{C}_3$  cycle (d)  $\text{C}_4$  cycle



56. Which of the following processes is common for aerobic and anaerobic respiration  
 (a) Glycolysis (b) Krebs cycle (c) ETS (d) None of these
57. Anaerobic respiration is also called  
 (a) Fermentation (b) PPP pathway (c) Glycolysis (d) Krebs cycle
58. How many ATP are formed during dephosphorylation in glycolysis ?  
 (a) 2ATP (b) 4ATP (c) 3 ATP (d) 6ATP
59. R.Q. of oxalic acid is  
 (a) Infinity (b) 4 (c) 0.7 (d) 1
60. Which process occurs in cytosol ?  
 (a) Photosynthesis (b) Krebs cycle  
 (c) Glycolysis (d) Oxidative phosphorylation
61. Synthetic processes of a cell comes under  
 (a) Anabolism (b) Metabolism (c) Catabolism (d) Growth
62. Degradation processes of a cell are referred under  
 (a) Anabolism (b) Catabolism (c) Metabolism (d) Growth
63. Pyruvic acid is  
 (a)  $\text{CH}_3\text{COCO}_2\text{H}$  (b)  $\text{CH}_3\text{CHO}$  (c)  $\text{CH}_3\text{CHOH CO}_2\text{H}$  (d)  $\text{CH}_3\text{CH}_2\text{OH}$
64.  $\text{CH}_3\text{CHO}$  is  
 (a) Acetaldehyde (b) Pyruvic acid (c) Ethanol (d) Lactic acid
65.  $\text{CH}_3\text{CH}_2\text{OH}$  represents  
 (a) Lactic acid (b) Acetic acid (c) Ethanol (d) Pyruvic acid
66. Respiratory substances are  
 (a) Substances available from air (b) Nutritive substances present in food  
 (c) Mineral elements (d) Excretory substances
67. For aerobic respiration, it is essential  
 (a)  $\text{O}_2$  (b)  $\text{CO}_2$  (c) CO (d)  $\text{H}_2\text{S}$
68. Acetaldehyde is formed from pyruvic acid, if it is removed  
 (a)  $\text{H}_2$  (b) CHO (c) 2 OH (d)  $\text{CO}_2$
69. Respiration type occurring in human red blood corpuscles is  
 (a) Anaerobic (b) Aerobic (c) Both A and B (d) Fermentation
70. Yeast  
 (a) Respires anaerobically, due to lack of mitochondria  
 (b) Respires aerobically, if it gets  $\text{O}_2$ , otherwise perform alcoholic fermentation  
 (c) Respires aerobically  
 (d) Can perform alcoholic fermentation

71. The end product of glycolysis of a glucose molecule is  
 (a) Pyruvic acid,  $\text{NADH}_2$  and ADP (b) Pyruvic acid,  $2\text{H}^+$ ,  $2\text{e}$  and 4 ATP  
 (c) 2 Pyruvic acid,  $2\text{NADH}_2$  and ATP (d) 2 Pyruvic acid,  $\text{NADH}_2$  and 2 ATP
72. The enzyme required to form acetaldehyde from pyruvic acid is  
 (a) Hexokinase (b) Oxidase  
 (c) Pyruvic acid decarboxylase (d) Alcohol dehydrogenase
73. Phosphorylation in general is \_\_\_\_\_  
 (a) Combination of phosphoric acid with a chemical  
 (b) Formation of PGA by adding P to glycerate  
 (c) Addition of ATP to glucose  
 (d) Synthesis ATP from ADP and P
74. Fructose 1,6 biphosphate splits into  
 (a) PGAL and DHAP (b) PGAL and PGA (c) PGAL and BPGA (d) PGA and BPGA.
75. Oxidative phosphorylation occurs in  
 (a) Cytosol (b) Cristae  
 (c) Mitochondrial matrix (d) Endoplasmic reticulum,
76. Malic acid is formed from fumaric acid  
 (a) By addition of  $\text{CO}_2$  (b) By addition of  $\text{H}_2\text{O}$  (c) By removal of  $\text{H}_2\text{O}$  (d) By removal of  $\text{CO}_2$
77. If  $\text{CO}_2$  and  $2\text{H}$  are removed from pyruvic acid, it is formed  
 (a) Acetyl co-enzyme A (b) Citric acid (c) Acetate (d) Co-A
78. It is by-product of Kреб's cycle  
 (a) Oxaloacetic acid (b) Citric acid (c) Acetyl co-enzyme (d) Acetate.
79. One ATP is formed when  
 (a) Succinic acid  $\rightarrow$  Fumaric acid (b)  $\alpha$ -ketoglutaric acid  $\rightarrow$  Succinyl CoA  
 (c) Succinyl CoA  $\rightarrow$  Succinic acid (d) Fumaric acid  $\rightarrow$  Malic acid.
80. Respiratory quotient and compensation point are  
 (a) Not related (b) Inverse to each other  
 (c) Same (d) Applicable to.all organisms.
81.  $\text{RQ} = 1$ , is  
 (a) The multiplication  $\text{O}_2$  consumed  $\text{O}_2$  and released  $\text{CO}_2$   
 (b) The amount of  $\text{O}_2$ , consumed and  $\text{CO}_2$  released are the same  
 (c) One  $\text{CO}_2$  molecule more released than  $\text{O}_2$  molecule consumed  
 (d) One  $\text{O}_2$  molecule more consumed than  $\text{CO}_2$  molecules released

82. If RQ is 0.7, the substance needs  
 (a) More O<sub>2</sub> for respiration  
 (b) Less O<sub>2</sub> for respiration  
 (c) O<sub>2</sub> is not used for its respiration  
 (d) The substance has more oxygen in its constitution
83. The site of occurrence of all reactions of PPP is  
 (a) Cytosol (b) Mitochondrial matrix  
 (c) Cristae (d) Thylakoid matrix
84. The process occurring during Kreb's cycle is  
 (a) Decarboxylation and dehydrogenation  
 (b) Decarboxylation, dehydrogenation and phosphorylation  
 (c) Decarboxylation and phosphorylation  
 (d) Dehydrogenation and phosphorylation
85. During glycolysis water is released from  
 (a) 2, Phospoglyceric acid (b) Biphosphoglyceric acid  
 (c) Phosphoenol pyruvic acid (d) Phosphoglyceraldehyde
86. When human muscle contracts :  
 (a) Respiration does not occur  
 (b) Anaerobic respiration occurs, if supply of oxygen is insufficient  
 (c) Anaerobic respiration never occurs  
 (d) Always anaerobic respiration occurs.
87. The correct sequence of the three processes of aerobic respiration is  
 (a) Glycolysis, Kreb's cycle, oxidative phosphorylation.  
 (b) Glycolysis, oxidative phosphorylation and Kreb's cycle  
 (c) Kreb's cycle, glycolysis and oxidative phosphorylation  
 (d) oxidative phosphorylation, Kreb's cycle, glycolysis
88. During PPP, RuBP is formed in  
 (a) Mitochondria (b) Cytosol (c) Stroma (d) Chloroplas
89. The number of ATP molecules formed in oxidative phosphorylation of one glucose molecule  
 (a) 6 (b) 14 (c) 28 (d) 34
90. The number of ATP molecules formed in oxidative phosphorylation of 1 pyruvic acid  
 (a) 6 (b) 14 (c) 28 (d) 34
91. How much energy spent in transport of one pyruvic acid to mitochondrion ?  
 (a) Energy of 1 ATP (b) No energy (c) Energy of 2 ATP (d) Not certain
92. In anaerobic respiration in plants (CM.C 1983, CPM.T. 1992)  
 (a) Oxygen is absorbed (b) Oxygen is released  
 (c) Carbon dioxide is released (d) Carbon dioxide is absorbed.

93. Krebs cycle takes place in  
(CPMT. 1985, 1999, M.P.P.M.T. 1997, AMU. 2000, AFMC 2002, RPMT. 2005)  
(a) Vesicles of E.R (b) Mitochondria (c) Dictyosomes (d) Chloroplasts.
94. By ETS, ATP-synthesis occurs on the (A.I.I.M.S. 1984)  
(a) Outer membrane of mitochondrion (b) Inner membrane of mitochondrion  
(c) Matrix (d) None of the above
95. Energy currency (reservoir) of the cells is  
(BHU 1984, Kerala 2001, AMU 2003, MPPMT 2002)  
(a) AMP (b) ATP (c) RNA (d) DNA
96. Complete oxidation of glucose into pyruvic acid with several intermediate steps is known as  
(C.B.S.E. 1988; B.H.U. 1986, 1989)  
(a) TCA-pathway (b) Glycolysis (c) HMS-pathway (d) Krebs cycle
97. When a molecule of pyruvic acid is subjected to anaerobic oxidation and forms lactic acid, there is  
(RPMT. 1985 BHU. 1985)  
(a) Loss of 3 ATP molecules (b) Loss of 6 ATP molecules  
(c) Gain of 2 ATP molecules (d) Gain of 4 ATP molecules
98. Conversion of pyruvic acid into ethyl alcohol is facilitated by the enzyme (AMU. 1986)  
(a) Decarboxylase (b) Dehydrogenase  
(c) Decarboxylase and dehydrogenase (d) Phosphotase
99. RQ for fatty substance/fat is (DPMT 1985; Karnataka 1999)  
(a) Infinity (b) Less than one (c) Greater than one (d) Zero
100. RQ for glucose carbohydrate is (D.P.M.T. 1985, Bih. PMT. 1990, RPMT. 1996, Wardha 2001)  
(a) 1 (b) 0.5 (c) 2 (d) 0.05
101. An indispensable role in energy metabolism is played by (D.P.M.T. 1986)  
(a) Sodium (b) Phosphorus (c) Calcium (d) Lithium
102. Instantaneous source of energy is {A.F.M.C. 1983}  
(a) Glucose (b) Fats (c) Proteins (d) Amino acid.
103. ATP equivalents produced during oxidation of succinate to fumarate for one glucose molecule is/are  
(R.PMT.1988)  
(a) 1 (b) 2 (c) 3 (d) 4
104. Which of the following process is used in the conversion of pyruvate to acetyl CoA ?  
(D.P.M.T. 1987; C.PMT 1990, Kerala 2004)  
(a) Oxidative decarboxylation (b) Oxidative dehydrogenation  
(c) Oxidative dehydration (d) Oxidative phosphorylation
105. During ATP synthesis electrons pass through (B.H.U.1980)  
(a) H<sub>2</sub>O (b) Cytochromes (c) CO<sub>2</sub> (d) O<sub>2</sub>

106. Net gain of ATP in glycolysis \_\_\_\_\_  
(M.P.PMT. 1988; D.P.M.T. 1983, Pb. PMT. 2000, CPM.T. 2001)  
(a) 6 (b) 2 (c) 4 (d) 8
107. The universal hydrogen acceptor is '  
(C.P.M.T. 1980)  
(a) NAD (b) ATP (c) CoA (d) FMN
108. Both respiration and photosynthesis require  
(M.P.P.M.T. 1989,1993,1996; CPM.T, 1984, 1988, 1989,-B.H.U. 1995;A.FMC 1995)  
(a) Sunlight (b) Chlorophyll (c) Glucose (d) Cytochromes
109. In an organism utilising carbohydrates as its source of energy anaerobically, the R.Q. is likely  
(UPMER 1983)  
(a) 0.7 (b) 0.9 (c) 1.0 (d) Infinity.
110. In plants energy is produced during the process of  
(CPMT 1981)  
(a) Photosynthesis (b) Transpiration (c) Respiration (d) Water absorption
111. In respiration pyruvic acid is  
(MPPMT. 1986, 1988)  
(a) Formed only when oxygen is available  
(b) One of the products of Krebs cycle  
(c) Broken down into a two carbon fragment and CO<sub>2</sub>  
(d) A result of protlipid breakdown.
112. Maximum number of ATP is synthcsised during oxidation of  
(R.PM.T. 1990)  
(a) β - amino acid (b) Malic acid (c) Palmitic acid (d) Glucose
113. NADP<sup>+</sup> is reduced to NADPH in  
(C.B.S.E. 1988)  
(a) HMP (b) Calvin Cycle (c) Glycolysis (d) EMP
114. Incomplete breakdown of sugars in anaerobic respiration forms  
(CPM.T. 1984,1988; M.P.P.M.T. 1987,1989)  
(a) Fructose and water (b) Glucose and CO<sub>2</sub> (c) Alcohol and CO<sub>2</sub> (d) Water and CO<sub>2</sub>
115. Which of the following is the source of respiration ?  
(C.P.M.T. 1979)  
(a) RNA (b) DNA (c) ATP (d) Stored food
116. Raw material of respiration is  
(R.R.M.T. 199)  
(a) Glucose and fructose (b) Glucose and sucrose  
(c) Glucose + O<sub>2</sub> (d) Glucose + CO<sub>2</sub>
117. Respiration is found in  
(B.H.V. 1980)  
(a) In all living cells in light (b) All living cells in dark  
(c) In all living cells both in light and dark (d) Only in nongreen cells both in light and dark
118. Anaerobic respiration is  
(CPMT. 1987)  
(a) Extramolecular respiration (b) Molecular respiration  
(c) Inter-molecular respiration (d) Intra-molecular respiration.

119. Total gain of energy in anaerobic respiration from one glucose molecule is (CPMT. 1987)  
 (a) Two ATP (b) One ATP (c) Four ATP (d) Three ATP
120. Final electron acceptor in respiration is (B.H.U. 1984, Karnataka 1994; A.F.M.C. 1998, A.M.U. 2001)  
 (a) Hydrogen (b) Oxygen (c) Cytochromes (d) Dehydrogenases
121. Oxidative phosphorylation is found in (M.P.P.M.T. 1987, 2002)  
 (a) Chloroplasts (b) Leucoplasts (c) Peroxisomes (d) Mitochondria
122. In *Opuntia* and other succulents, night time R.Q. is (CPMT, 1986)  
 (a) One (b) More than one (c) Zero (d) Less than one
123. RQ of protein rich pulses is ' (RPMT. 1989)  
 (a) Unity (b) Infinity (c) More than unity (d) Less than one
124. Oxidation of a molecule of acetyl CoA produces (RPMT. 1990)  
 (a) 12 ATP (b) 15 ATP (c) 6 ATP (d) 19 ATP
125. Maximum amount of energy/ATP is liberated on oxidation of (AFMC 1984, 1988; CPMT. 1988; CB.S.E. 1994; AMU 1996)  
 (a) Fats (b) Proteins (c) Starch (d) Vitamins
126. R.Q. is ratio of; (C.B.S.E.'1990;A.P.M.E.E. 1999, Glijarat GET Q.B.)  
 (a) CO<sub>2</sub> produced to substrate consumed  
 (b) CO<sub>2</sub> produced to O<sub>2</sub> consumed  
 (c) Oxygen consumed to water produced  
 (d) Oxygen consumed to CO<sub>2</sub> produced
127. Connecting link between glycolysis and Krebs cycle is/before entering Krebs cycle pyruvate is changed to (A.F.M.C, 1988; CB.S.E. 1992, 1997; R.PMT. 1992; M.P.P.M.T. 1987, 88, 93, 98, 2001, 2002; AMU. 1987, 2001; J.LPME.R; 1989; C.PMT. 1991, 94; D.P.M.T. 1999; A.UMS. 1994, Mampal 2001, BV. 2002, Kerala 2003, 2004)  
 (a) Oxaloacetate (b) PEP (c) Pyruvate (d) Acetyl CoA
128. Apparatus to measure rate of respiration and R.Q. is (C.P.M.T. 1991; C.B.S.E. 1992)  
 (a) Auxanometer (b) Potometer (c) Respirometer (d) Manometer
129. Terminal cytochrome of respiratory chain which donates electrons to oxygen is (CPMT 1989; CBSE, 1992)  
 (a) Cyt b (b) Cyt c (c) Cyt a (d) Cyt a<sub>3</sub>
130. R.Q. is maximum when respiratory substrate is (MPPMT. 1992; A.U.M.S. 1992)  
 (a) Glucose (b) Fat (c) Protein (d) Malic acid.
131. End product of citric add/Krebs cycle is (CBSE. 1993; Har. P.M.T. 1994)  
 (a) Citric acid (b) Lactic acid (c) Pyruvic acid (d) CO<sub>2</sub> + H<sub>2</sub>O

132. Krebs cycle is (AMU. 1993)  
 (a) Oxidation of glucose to alcohol and water  
 (b) Oxidation of acetyl CoA to carbon dioxide and water involving electron transport  
 (c) Complete oxidation of acetyl CoA without electron transport  
 (d) Complete reduction of acetyl CoA to carbon dioxide and water.
133. Most of the biological energy is supplied by mitochondria through (M.P.PMT.1994, AMU. 1998)  
 (a) Breaking of proteins (b) Reduction NADP<sup>+</sup>  
 (c) Breaking of sugars (d) Oxidising TCA substrates.
134. Which one is a product of glycolysis, besides 2 ATP ? (CPMT. 1995; M.P.PMT. 1998)  
 (a) FAD (b) NADH (c) NAD (d) NADP
135. The site of Krebs cycle in bacteria is (Bihar P.M.T. 1995)  
 (a) Nucleoid (b) Cytoplasm (c) Plasma membrane (d) Ribosomes
136. Which is the product of aerobic respiration? (A.F.M.C 1995)  
 (a) Malic acid (b) Ethyl alcohol (c) Lactic acid (d) Pyruvic acid
137. Which one can respire in the absence of oxygen ? (R.P.M.T. 1996)  
 (a) Seeds (b) Leaves (c) Stem (d) Root
138. Lactic acid fermentation does not produce (A.UMS. 1996; Pb. P.M.T. 1997; AMU. 1999)  
 (a) ATP (b) CO<sub>2</sub> and NADH (c) CO<sub>2</sub> (d) NADH
139. Electron transport system of mitochondria is located in (M.P.PMT. 1997, CPMT. 1999, R.PMT.2000)  
 (a) Outer membrane (b) Inner membrane (c) Inter-cristal space (d) Outer chamber.
140. In bacteria the site for respiration is (CB.S.E. 1997)  
 (a) Cytoplasm (b) Mesosome (c) Episome (d) Plasmid
141. Which is wrong about cytochrome P-450 ? (C.B.S.E. 1998)  
 (a) Contains iron (b) Is a coloured cell  
 (c) Is an enzyme (d) Plays an important role in metabolism.
142. Production of alcohol by Yeast fermentation is ..... process (Pb. P.M.T. 1998)  
 (a) Anaerobic (b) Aerobic (c) Light dependent (d) Both A and C.
143. In glycolysis, enzyme enolase produces (AM.U. 1999)  
 (a) Phosphoglyceric acid (b) Phosphoenol pyruvate  
 (c) Phosphoglyceraldehyde (d) Pyruvate
144. Oxygen is reduced to water in (Kerala 2000,2006)  
 (a) Fermentation (b) Calvin cycle  
 (c) Electron transport (d) Krebs cycle  
 (e) Glycolysis

145. Cytochrome is (C.B.S.E. 2001)  
 (a) Metalloflavoprotein (b) Fe-containing porphyrin pigment  
 (c) Lipid (d) Glycoprotein
146. Isocitric acid is changed to  $\alpha$ -oxalosuccinic acid by (Tamil.Nadu 2001)  
 (a) Oxidative carboxylation (b) Oxidative decarboxylation  
 (c) Dehydrogenation (d) Hydrogenation and decarboxylation.
147. In respiration (Manipal 2002)  
 (a) 2 PGAL are formed in glycolysis and none in Krebs cycle  
 (b) 6 PGAL in glycolysis, 3 PGAL in Krebs cycle  
 (c) 8 PGAL in glycolysis, 3 PGAL in Krebs cycle  
 (d) PGAL formation does not occur in respiration.
148. Glycolysis takes place in (A.F.M.C 2003)  
 (a) All cells (b) Only eukaryotic cells  
 (c) Muscle cells (d) Nerve cells
149. Which is rich in energy (CE.T. Chd.2003)  
 (a)  $\text{NAD}^+$  (b) Mitochondria (c) FAD (d) ATP
150. Which one requires oxygen (AMU. 2003)  
 (a) Fermentation (b) EMP pathway  
 (c) Pentose phosphate pathway (d) None of the above
151. Mechanism of aerobic respiration was discovered by (A.F.M.C. 2004)  
 (a) Calvin (b) Krebs (c) Pasteur (d) Hatch and Slack
152. Which of the following is the first step of glycolysis (C.P.M.T. 2004)  
 (a) Conversion of glucose to fructose (b) Dehydrogenation of glucose  
 (c) Breakdown of glucose (d) Phosphorylation of glucose
153. How many ATP molecules are released when one molecule of glucose is oxidised in our liver cells (CP.M.t:2'ob5)  
 (a) 36 (b) 38 (c) 2 (d) 8
154. RQ of anaerobic respiration is (Wardha2005)  
 (a)  $< 1$  (b) 0 (c) 1 (d)  $> 1$
155. Which one is an important intermediate formed in all types of respiration (Wardha2005)  
 (a) Acetyl CoA (b) Oxaloacetate (c) Pyruvic acid (d) Tricarboxylic acid
156. What is RQ of the reaction  $2\text{C}_{51}\text{H}_{98}\text{O}_6 + 145\text{O}_2 \rightarrow 10_2\text{CO}_2 + 98\text{H}_2\text{O}$ . (Manipal 2005)  
 (a) 0.7 (b) 1.0 (c) 1.45 (d) 1.62
157. Single turn of citric acid cycle yields (Kerala2005)  
 (a)  $2 \text{FADH}_2, 2 \text{NADH}_2, 2 \text{ATP}$  (b)  $1 \text{FADH}_2, 2 \text{NADH}_2, 1 \text{ATP}$   
 (c)  $1 \text{FADH}_2, 4 \text{NADH}_2, 1 \text{ATP}$  (d)  $1 \text{FADH}_2, 1 \text{NADH}_2, 1 \text{ATP}$   
 (E)  $1 \text{FADH}_2, 1 \text{NADH}_2, 2 \text{ATP}$ .



158. RQ is less than one, if the respiratory substrate is (Manipal 2005)  
 (a) Organic acids (b) Fats and proteins (c) Sucrose (d) Glucose
159. Enzyme used in conversion of glucose to glucose 6-phosphate is (J.I.P.M.E.R. 2005)  
 (a) Hexokinase (b) Isomerase  
 (c) Phosphokinase (d) Phosphohexokinase
160. Identify the compound that links glycolysis and Krebs cycle (Karnataka 2005)  
 (a) Oxaloacetate (b) Pyruvic acid (c) Lactic acid (d) Acetyl CoA
161.  $F_0$  base of oxysome is towards : (M.H. 2005)  
 (a) Outer chamber (b) Matrix (c) Inner chamber (d) Both B and C
162. Muscle cells starved of oxygen and supplied with pyruvic acid will produce (M.H. 2005)  
 (a) Ethanol (b) Lactic acids (c)  $CO_2$  only (d)  $CO_2$  and  $H_2O$
163. Products of anaerobic respiration are (J.I.P.M.E.R. 2005)  
 (a) Water and alcohol (b) Water and oxygen (c) Alcohol and  $CO_2$  (d)  $CO_2$  and water
164. During which stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP (C.B.S.E. 2005)  
 (a) Glycolysis (b) Krebs cycle  
 (c) Conversion of pyruvic acid to acetyl CoA (d) Electron transport chain.
165. How many molecules of  $NADH_2$  are produced when four molecules of phosphogyceraldehyde are converted into four molecules of pyruvate (Guj.CET. 2006)  
 (a) 8 (b) 2 (c) 4 (d) 6
166. The overall goal of glycolysis, Krebs cycle and electron transport system is the formation of (C.B.S.E. 2007)  
 (a) ATP in one large oxidation reaction (b) Sugars  
 (c) Nucleic acid (d) ATP in small steps

**ANSWER KEY**

- |          |          |          |          |
|----------|----------|----------|----------|
| 1. (b)   | 2. (c)   | 3. (c)   | 4. (b)   |
| 5. (a)   | 6. (c)   | 7. (a)   | 8. (d)   |
| 9. (a)   | 10. (a)  | 11. (c)  | 12. (a)  |
| 13. (d)  | 14. (b)  | 15. (b)  | 16. (a)  |
| 17. (d)  | 18. (d)  | 19. (a)  | 20. (c)  |
| 21. (a)  | 22. (b)  | 23. (a)  | 24. (b)  |
| 25. (b)  | 26. (b)  | 27. (b)  | 28. (b)  |
| 29. (c)  | 30. (b)  | 31. (d)  | 32. (b)  |
| 33. (a)  | 34. (c)  | 35. (b)  | 36. (c)  |
| 37. (d)  | 38. (b)  | 39. (c)  | 40. (a)  |
| 41. (a)  | 42. (b)  | 43. (a)  | 44. (b)  |
| 45. (a)  | 46. (b)  | 47. (c)  | 48. (a)  |
| 49. (b)  | 50. (b)  | 51. (b)  | 52. (a)  |
| 53. (b)  | 54. (b)  | 55. (b)  | 56. (a)  |
| 57. (a)  | 58. (b)  | 59. (b)  | 60. (c)  |
| 61. (a)  | 62. (b)  | 63. (a)  | 64. (a)  |
| 65. (c)  | 66. (b)  | 67. (a)  | 68. (d)  |
| 69. (a)  | 70. (b)  | 71. (d)  | 72. (c)  |
| 73. (a)  | 74. (a)  | 75. (b)  | 76. (b)  |
| 77. (c)  | 78. (b)  | 79. (c)  | 80. (a)  |
| 81. (b)  | 82. (a)  | 83. (a)  | 84. (b)  |
| 85. (a)  | 86. (b)  | 87. (a)  | 88. (b)  |
| 89. (d)  | 90. (b)  | 91. (a)  | 92. (c)  |
| 93. (b)  | 94. (b)  | 95. (b)  | 96. (b)  |
| 97. (a)  | 98. (c)  | 99. (b)  | 100. (a) |
| 101. (b) | 102. (a) | 103. (b) | 104. (a) |
| 105. (b) | 106. (d) | 107. (a) | 108. (d) |
| 109. (d) | 110. (c) | 111. (c) | 112. (c) |
| 113. (a) | 114. (c) | 115. (d) | 116. (c) |
| 117. (c) | 118. (d) | 119. (a) | 120. (b) |
| 121. (d) | 122. (c) | 123. (d) | 124. (a) |
| 125. (a) | 126. (b) | 127. (d) | 128. (c) |
| 129. (d) | 130. (d) | 131. (d) | 132. (c) |
| 133. (d) | 134. (b) | 135. (c) | 136. (a) |
| 137. (a) | 138. (b) | 139. (b) | 140. (b) |
| 141. (b) | 142. (a) | 143. (b) | 144. (c) |
| 145. (b) | 146. (b) | 147. (a) | 148. (a) |
| 149. (d) | 150. (d) | 151. (b) | 152. (d) |
| 153. (b) | 154. (b) | 155. (c) | 156. (a) |
| 157. (c) | 158. (b) | 159. (a) | 160. (d) |
| 161. (a) | 162. (b) | 163. (c) | 164. (d) |
| 165. (c) | 166. (d) |          |          |



## Unit -IV

### Chapter-18. Growth and Development in plants

#### IMPORTANT POINTS

- In plants development is considered as the sum of these processes - (1) Growth and (2) Differentiation.
- During this process a complex body organisation is formed that produces roots, leaves, branches, flowers, fruits, seeds eventually they die.
- Growth can be defined as an irreversible increase in the size and weight also number of the cells of an organism. Physiologically speaking, growth is an outcome of metabolism. There is an increase in the dry weight as an outcome of growth.
- In plants, growth is limited to meristematic tissues only. There are three main activities involved in the process of growth - (1) Cell division of meristematic cells. (2) Enlargement of newly formed cells. (3) Cellular differentiation.
- Growth in length is called- primary growth and growth in the girth is called- secondary growth. The increased growth per unit time is known as growth rate.
- Growth is divided into three phases: (1) Phase of cell division. (2) Phase of cell enlargement and (3) Phase of cell differentiation. The entire period, covering the period from cell division to cell differentiation is called grand period of growth.
- Some cells lose power of division and acquire definite characteristics and become permanent tissue. These are called differentiated cells. Such differentiated cells regain their power of division under specific conditions; these cells are called dedifferentiated cells (eg. root cambium)
- Factors which affect growth are water, oxygen, temperature, light and nutrients. For a more exact measurement of growth in length of a plant, an auxanometer is used.
- Development is a term that includes all changes, that an organism goes through during its life cycle from germination of the seed to senescence. The plant growth regulators (PGRs) are small, simple, molecules of diverse chemical composition. Such chemicals are called plant-growth regulators or plant hormones. They are classified into five main groups: (1) Auxins, (2) Gibberellins, (3) Cytokinins, (4) Abscisic acid and (5) Ethylene. Some of the vitamins also act as growth-regulators.
- Seed dormancy is defined as a state in which seeds are prevented from germinating even under environmental conditions or external factors normally are favorable for germination. There are mainly four types of dormancy: (1) Exogenous dormancy, (2) Endogenous dormancy, (3) Combinational dormancy, (4) Secondary dormancy. The entire process from the sowing of the seed in the soil to the emergence of a young sapling, constitutes germination. "Mangroves" are a special type of vegetation which live in the basin (creek) region around sea-shore. They exhibit a different kind of germination, such a germination is called "Viviparous germination".
- Senescence is a period between complete maturation of an individual and the death of that individual. The phenomenon of the dropping of leaf, flower and fruit is called-abscission. In the development

of plants and process of flowering, response to the stimulus of “period of available light” by plants is called photoperiodism. Better and earlier germination is induced, when seeds are provided with specific low temperatures for a definite period of time. Flowering is also earlier in the plants which develop from them. This artificial treatment is called vernalization.

There are two main types of plant movements; (a) Locomotory movement (1) Autonomous movement; (i) Amoebic movement; (ii) Induced movement; (iii) Circulatory movement and (iv) Rotation movement. (2) Induced movement (i) Phototaxis, (ii) Chemotaxis (iii) Thermotaxis, (iv) Thigmotaxis. (b) Curvature movements: (1) Autonomous movement (i) Epinasty, (ii) Hyponasty, (iii) Nutation, (iv) Circumnutation and (v) Variation. (2) Induced movement: There are two types: (i) Tropism, (a) Phototropism, (b) Geotropism, (c) Hydrotropism and (ii) Nastism, (a) Photonasty, (b) Thermonasty (c) Hydronasty, (d) Thigmonasty

1. What is the maximum period of growth ?  
 (a) Slow growth rate    (b) Steady growth rate  
 (c) Speedy growth rate    (d) Senescence phase
2. Which apparatus is used for measurement of growth ?  
 (a) Auxanometer    (b) Potometer    (c) Photometer    (d) Hydrometer
3. Ethylene is responsible for  
 (a) Flowering    (b) Disease in roots    (c) Ripping of fruits    (d) Formation of fruits
4. What is the cause of ‘Bakane’ disease?  
 (a) Fungi    (b) Algae    (c) Bacteria    (d) Virus
5. Which substances are secreted at the apex of plant and they regulate growth of another region ?  
 (a) Enzymes    (b) Hormones    (c) Vitamins    (d) None of the above
6. Which type of growth is seen in plants?  
 (a) Irreversible    (b) Increase in volume    (c) Local    (d) Reversible
7. Which of the following substance is not related with initiation of growth ?  
 (a) ABA    (b) Gibberellin    (c) IAA    (d) Cytokinin
8. Which group is correct for the growth inducer hormone ?  
 (a) IAA, ABA and cytokinins    (b) IAA, Gibberellin, ABA  
 (c) IAA, Gibberellin, cytokinins    (d) ABA, Ethylene
9. What is the main origin of cytokinin?  
 (a) Stem apex    (b) Root apex    (c) Young leaves    (d) Lateral buds
10. Mention the effect of cytokinin  
 (a) It induces cell division and retards the process of senescence  
 (b) It maintains dormancy  
 (c) It induces senescence  
 (d) It inhibits cell division



22. Which of the following physiological process performed by gibberrellic acid?  
 (a) Dwarfism of tall plant genetically  
 (b) Elongation of short plant genetically  
 (c) Growth in size of stem and root formation  
 (d) Yellowing of young leaves
23. Which of the following is used to enhance colour of fruits and more juice in fruits unnaturally?  
 (a) Sodium chloride (b) IAA (c) Ethylene gas (d) kinetin
24. Which hormone is responsible for apical dominance?  
 (a) Auxin (b) Cytokinin (c) Gibberrelin (d) Ethylene
25. With which reaction Phytochrome is associated ?  
 (AIMS- 1989, 1990, CBSE 1988, BHU 1981, 1991)  
 (a) Phototropism (b) Photorespiration (c) Photo-period (d) Geotropism
26. In the absence of light, amount of which of the following is increased ?  
 (a) Absorption of mineral salts (b) Absorption of water  
 (c) Elongation of internodes (d) Ascent of sap
27. When is abscission- layer formed? (AIIMS- 1980)  
 (a) With increased concentration of auxin (b) With decreased concentration of auxin  
 (c) With increased concentration of gibberrelin (d) With decreased concentraton of gibberrelin
28. Vernalization is (MPPMT- 1990, AMU- 1999, IKCMEE- 2000)  
 (a) Growth graph related to light  
 (b) Effect of photoperiod on the growth of plant, which results flowering  
 (c) Rapid growth in low temperature  
 (d) Daily photo period
29. What is initiative substance of IAA? (PMT- 1990- APMEE 2002)  
 (a) Tryptophan (b) Lucine (c) Tyrosine (d) Phehyl alamine
30. What is apical dominance? (CPMT- 1989)  
 (a) Growth of apical bud is inhibited due to nearby lateral buds  
 (b) Growth of apical bud is promoted due to removal of nearest lateral buds  
 (c) Removal of apical bud hinders growth of lateral buds  
 (d) Development of lateral buds hinders due to presence of apical bud
31. Which of the following is water stress hormone?  
 (CBSE-1993, MPPMT-1995, BHU 1998, CETCHD, Kerala 2000, Orissa- 2003)  
 (a) Benzyl amino purine (b) 2,4- dichlorophenoxy acetic acid  
 (c) Ethylene (d) Absciscic acid
32. If apical region of stem is removed from any plant, what is observed?  
 (CMPT - 1993, CBSE -1994, 2000, KARNATAKA - 2000)  
 (a) New apical bud formation (b) Length of main stem increases  
 (c) Plant dies (d) Lateral branches emerges

33. Which of the hormone is synthetic ? (MPPMT 1996, AIIMS 1996, BHU 1997, CPMT 1999)  
 (a)  $GA_3$                       (b)  $GA_2$                       (c) IAA                      (d) 2-4 D
34. What is 2-4 D ?  
 (a) Weedicide      (b) Insecticide      (c) Rodenticide      (d) Wormicide
35. What is agent Orange ? (CBSE 1998, AIMS 1999)  
 (a) Weedicide with dioxin                      (b) Chemical used in luminiscent plant  
 (c) Insecticide which is biodegradable      (d) Colour used in tube light
36. One plant group kept for 12 hrs in day and 12 hrs in night and flowering is observed in it. Another plant group is kept similarly for day - night period and for very short time light is given during dark period it do not flower. What is such type of plant called ? (CBSE 2004)  
 (a) Long-day plants                      (b) Day-neutral plants  
 (c) Medium-day plants                      (d) Short-day plants
37. How gibberrelin accelerates seed germination ? (AIIMS 2005)  
 (a) By effecting rate of cell division      (b) By the synthesis of digestive juice  
 (c) Abscisic acid                      (d) Absorption of water from hard seed coat
38. What is the colour of Phytochrome pigment ?  
 (a) Yellowish green      (b) Bluish                      (c) Red                      (d) Pink
39. What is the reason of senescence leaf ?  
 (a) Ethylene                      (b) Abscisic acid      (c) cytokinin                      (d) Auxin
40. Which hormone is responsible for bolting ?  
 (a) Auxin                      (b) Cytokinin                      (c) Gibberrelin                      (d) Ethylene
41. Which hormone is synthesized by root and endosperm?  
 (a) Auxin                      (b) Cytokinin                      (c) Gibberrelin                      (d) Ethylene
42. Which hormone is responsible for growth of leaf-apex ?  
 (a) IAA                      (b) Zeatin                      (c) Gibberrelin                      (d) Ethylene
43. How can a biannual plant be converted into an annual plant?  
 (a) By cold process of seeds  
 (b) By giving more light  
 (c) By giving more oxygen  
 (d) By giving more temperature
44. Which of the following reaction is observed in dropping of drocera due to insects ?  
 (a) Thigmonasty                      (b) Chemotropism      (c) Photonasty                      (d) Thigmotropism
45. What is responsible for opening and closing of tulip flower ?  
 (a) Photonastic movement                      (b) Geotropism  
 (c) Thermonasty                      (d) Nictinasty
46. By which reaction growth of cuscuta occurs on host plant ?  
 (a) Thigmotropism                      (b) Chemtropism      (c) Thigmonasty                      (d) Photonasty

47. Which type of meristematic tissue is found in monocot plant for growth ?  
 (a) Intercalary meristematic tissue      (b) Apical meristem tissue  
 (c) Lateral meristem tissue                (d) Meristematic tissue
48. Which of the following is increased in plants as a result of growth ?  
 (a) Dry volume      (b) Width              (c) Number              (d) Dry weight
49. Which of the following is criteria for measurement of growth ?  
 (a) Number      (b) Weight              (c) Volume              (d) All a, b, c
50. In which phase of growth size of vacuole increases ?  
 (a) Cell formation    (b) Cell elongation    (c) cell differentiation    (d) Cell transfer
51. What is the optimum temperature for growth of the plants ?  
 (a) 25 to 30°C      (b) 28 to 30°C      (c) 0 to 30°C              (d) 0 to 28°C
52. Which apparatus is used for exact measuring of growth of plants in longitudinal axis ?  
 (a) Measuring scale      (b) Auxanometer    (c) Manometer      (d) Sphigomanometer
53. Growth regulators are chemically .....  
 (a) Organic chemicals    (b) Inorganic chemicals    (c) Minerals    (d) Vitamins
54. From where auxin was isolated for the first time ?  
 (a) Coleoptile of oat              (b) Sperm cell of herring fish  
 (c) Paddy plant                      (d) Human urine
55. Which of the following should be used for the control of weeds in farms ?  
 (a) Cytokinin      (b) Auxin      (c) Gibberrelin      (d) Ethylene
56. Which chemical induces formation of adventitious roots ?  
 (a) Gibberrelin    (b) IAA      (c) Absciscic acid    (d) Cytokinins
57. Which is incorrect for the effects of auxin ?  
 (a) Induces +ve phototropism    (b) Induces growth and length in stem  
 (c) Shows apical dominance      (d) Induces -ve phototropism in roots
58. Which of the following organic substance is growth inhibitor ?  
 (a) IBA              (b) ABA              (c) IAA              (d) GA
59. From where indole acetic acid an organic substance was isolated for the first time ?  
 (a) Animal fat      (b) Gibberrela      (c) Human urine    (d) Fish
60. Cytokinin is formed in which of the following region ?  
 (a) Region of cell elongation    (b) Regions of senescence  
 (c) Regions of cell division      (d) Regions of abscission
61. Which hormone reduces the dominance of apical bud ?  
 (a) Auxin              (b) ABA              (c) Ethylene              (d) Cytokinin
62. Which is incorrect option for cytokinin ?  
 (a) Retards senescence                      (b) Secreted in the region of active cell division  
 (c) Increases dominance of apical bud      (d) Stimulates cell division

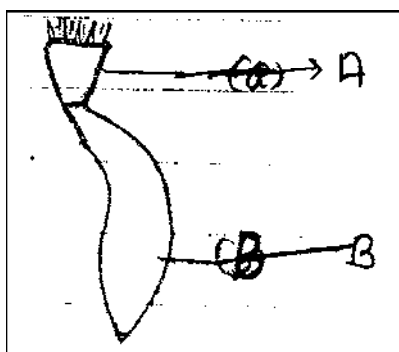


63. Drooping of fruit, after fruit maturation (ripening) shows .....  
 (a) Increase in amount of auxin      (b) Decreases in amount of auxin  
 (c) Reduces in amount of ABA      (d) Increase gibberrellic acid
64. Which of the following is mismatched statement for effect of auxin ?  
 (a) It inhibits lateral growth      (b) It induces stem elongation in plant  
 (c) It induces cell division      (d) It helps in further elongation of some regions
65. Which hormone is essential for initial growth of root ?  
 (a) IBA      (b) GA      (c) ABA      (d) Kinetin
66. Which is the specific use of synthetic auxin in higher concentration ?  
 (a) Weedicide  
 (b) Inhibits growth of lateral buds  
 (c) Inhibits initial process of root formation  
 (d) Regulates cell elongation
67. Which of the following organic chemical is synthetic ?  
 (a) 2-4-D      (b) IAA      (c) GA      (d) IBA
68. Which is required to inhibit germination of food storing part of potato ?  
 (a) ABA      (b) IAA      (c) IBA      (d) GA
69. This hormone induces growth of root but inhibits growth of .....  
 (a) Apical bud      (b) Unfertilized fruit developement  
 (c) Lateral buds      (d) Root
70. What is indicated by any of the developing plant if it increase / hyperactivity in lateral buds ?  
 (a) It obtains more light      (b) Cytokinin decreases  
 (c) It stores more food      (d) Auxin decreases
71. From where gibberrelin was isolated for the first time ?  
 (a) Penicillium      (b) Asparagus      (c) Mucor      (d) Gibberella
72. Which of the following effect of gibberrelin is observed in plant ?  
 (a) Long plant shortens      (b) Dwarf plant grows in longitudinal axis  
 (c) Induces formation of root system      (d) Yellowing of young leaves
73. Which of the following hormone is responsible for cell division ?  
 (a) GA      (b) IAA      (c) Cytokinin      (d) Abscisic acid
74. Garland of green leaves remain green, by treatment of which organic chemical ?  
 (a) Cytokinin      (b) Auxin      (c) Ethylene      (d) Gibberrelin
75. Which hormone inhibits senescence of vegetative parts and plants ?  
 (a) Auxin      (b) Cytokinin      (c) Gibberrelin      (d) Abscisic acid
76. Which is natural growth inhibitor or senescence inducing hormone ?  
 (a) IAA      (b) ABA      (c) NAA      (d) GA
77. Which hormone affects the growth of plant in adverse climatic / environmental condition ?  
 (a) Abscisic acid      (b) Ethylene      (c) NAA      (d) 2-4, D

78. Which of the following phenomenon is regulated by abscisic acid ?  
 (a) Shoot elongation (b) Origin of cell wall and cell elongation  
 (c) Opening and closing of stomata (d) Abscission of leaf and dormancy
79. Which hormone inhibits formation of new cells ?  
 (a) Abscisic acid (b) Kinetin (c) Gibberrellic acid (d) Indol-butamic acid
80. Which of the following is responsible for seed dormancy ?  
 (a) Abscisic acid (b) Ethylene (c) Gibberrelin (d) Auxin
81. Name the hormone responsible for activity of chlorophyll in leaves.  
 (a) Cytokinin (b) Ethylene (c) Gibberrelin (d) ABA
82. Which of the following is simple, volatile hormone ?  
 (a) Ethylene (b) ABA (c) IAA (d) Cytokinin
83. Which of the following statement about ABA is inappropriate ?  
 (a) Induces ripening of fruit (b) Inhibits seed germination  
 (c) Induces dormancy of bud (d) Closes stomata
84. Which hormone is absent in dormant seed ?  
 (a) ABA (b) Auxin (c) GA (d) Ethylene
85. Which of the following statement is true for abscisic acid ?  
 (a) Inhibits transcription of gene (b) Opens stomata  
 (c) Reduces senescence (d) Acts as weedicide
86. By which physiological process water enters into seed coats of seed ?  
 (a) Endosmosis (b) Diffusion (c) Plasmolysis (d) Imbibition
87. What is called the effect of daylight on plant ?  
 (a) Phototropic (b) Photoperiodism (c) Photooxidation (d) Photonastism
88. Which of the following is correct option for seed germination ?  
 (a) Emergence of radicle from primary root (b) Emergence of primary root forms from radicle  
 (c) Development of primary root (d) No root formation
89. What is the rate of respiration during seed germination ?  
 (a) Slow (b) Steady (c) Rapid (d) Zero
90. Which of the following group show viviparous germination ?  
 (a) Rhizophora and Avicinnia (b) Orchid and Rhizophora  
 (c) Maize and Bean (d) Soyabean and Xanthium
91. Which of the following is found in high concentration in healthy leaf ?  
 (a) Cytokinin (b) Gibberrelin (c) Auxin (d) Ethylene
92. From the given below which is short-day plant ?  
 (a) Paddy (b) Wheat (c) Oat (d) Opium
93. Which of the following is long-day plant ?  
 (a) Oat (b) Soyabean (c) Vinca (d) Paddy

94. Which hormones are obtained from fungi and fish, respectively ?  
 (a) Gibberrelin and zeatin      (b) IAA and IBA  
 (b) Gibberrelin and 2-4 D      (d) Gibberrelin and cytokinin
95. Vernalization means.....  
 (a) Growth Graph  
 (b) Flowering at high temperature  
 (c) Effect of light on growth  
 (d) Speedy flowering at low temperature
96. Flowering due to low temperature is .....  
 (a) Thermonasty    (b) Vernalization    (c) Nutation      (d) Photonasty
97. If temporary light is made available for dark phase of long day plant, what is observed ?  
 (a) Flowering will not occur    (b) Increase in flowering  
 (c) Decreasing in flowering    (d) No change
98. Which is an essential temperature for more production of wheat by noting effect of low temperature ?  
 (a) 1 to 20°C      (b) 28 to 30°C    (c) 1 to 10°C      (d) 25 to 30°C
99. By which condition flowering take place in short day plant ?  
 (a) Short day and long night    (b) Short day and short night  
 (c) Short night                      (d) Long day and short night
100. Which type of light is required in long day plants for flowering ?  
 (a) Red light                              (b) More light than allotted period  
 (c) Less light than allotted time period    (d) All of the given
101. Where is phytochrome pigment present ?  
 (a) Fungi              (b) Algae              (c) Bryophyta              (d) Phanerogams
102. Which physiological reaction is essential for development leaftendril ?  
 (a) Curvature      (b) Nastism      (c) Circumnutation      (d) Tropism
103. Photoperiodism is .....  
 (a) Time table of day-night based on light    (b) Flowering plant  
 (c) Effect of length of day on flowering      (d) Irregular growth based on light
104. Which hormone is essential in pineapple for inducing flowering, without season ?  
 (a) Ethylene      (b) Zeatin              (c) Absciscic acid      (d) NAA
105. Which of the following plant shows rotational movement ?  
 (a) Volvox      (b) Chlamydomonas    (c) Hydrilla              (d) Mucilagenous fungi
106. Which of the following is example of amoeboid movement ?  
 (a) Algae                              (b) Fungi  
 (c) Gametes of bryophyta      (d) Hydrilla
107. Which of the following option shows an examples of cilliary movement ?  
 (a) Zoo spores and Bryophyta      (b) Chlamydomonas  
 (c) Slime mould                      (d) All the three a, b, c

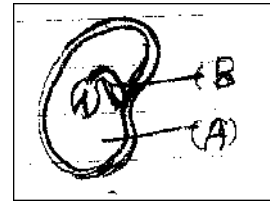
108. Which plant show movement from intense light to dim light ?  
 (a) Volvox            (b) Lotus            (c) Hydrilla            (d) Plankton
109. Which of the following show movement by chemical ?  
 (a) Male gametes of bryophytes and pteridophytes  
 (b) Male gametes of fungi and algae  
 (c) Male gametes of gymnosperm and angiosperms  
 (d) Flower of tulip and crocus
110. Which of the following is an example of thermonasty ?  
 (a) Lotus            (b) Crocus  
 (c) Mimosa            (d) Sunflower
111. In which structure thigmonasty is observed in simple form ?  
 (a) Leaf apex      (b) Shoot apex      (c) Root apex      (d) Leaf tendril
112. Demonstration of cytoplasmic movement in living cell can be observed in .....  
 (a) Onion cells                      (b) Medullary cells  
 (c) Leaf cells of tradescantia      (d) Cells of vascular bundle
113. Which factor increases in plant in absence of light ?  
 (a) Availability of water, increases ascent of sap.  
 (b) Availability of mineral ion, increases mineral nutrition  
 (c) Area of leaf-blade increase, rate of transpiration increases.  
 (d) Length of internode increases, growth of plant in longitudinal axis.
114. Sensitivity of leaves in Mimosa, depends on which factor ?  
 (a) Temperature    (b) Light    (c) Water    (d) Touch
115. Movement of cilia in Drosera, depends on which factor ?  
 (a) Light    (b) Temperature    (c) Touch    (d) Osmosis
116. Which are the labelled part A and B ?



- (a) Fruit and plumule  
 (b) Plumule and radicle  
 (c) Fruit and radicle  
 (d) Plumule and cotyledon

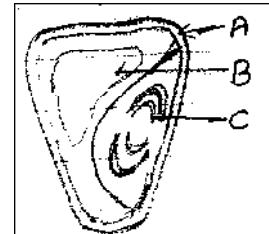
117. Which is the labelled part A and B given in the figure ?

- (a) Cotyledon and Hypocotyl
- (b) Cotyledon and plumule
- (c) Cotyledon and Epicotyl
- (d) Fruit and hypocotyl



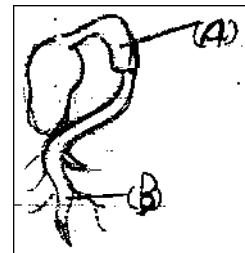
118. Which are the part labelled as A, B and C sequentially in the figure ?

- (a) Seed coat, cotyledon, plumule
- (b) Seed coat, Endosperm, plumule
- (c) Plumule, radicle, cotyledon
- (d) Cotyledon, plumule, embryo



119. Mention part A and B, labelled in the figure.

- (a) Radicle, primary root
- (b) Epicotyl, radicle
- (c) Hypocotyl, primary root
- (d) Epicotyl, primary root



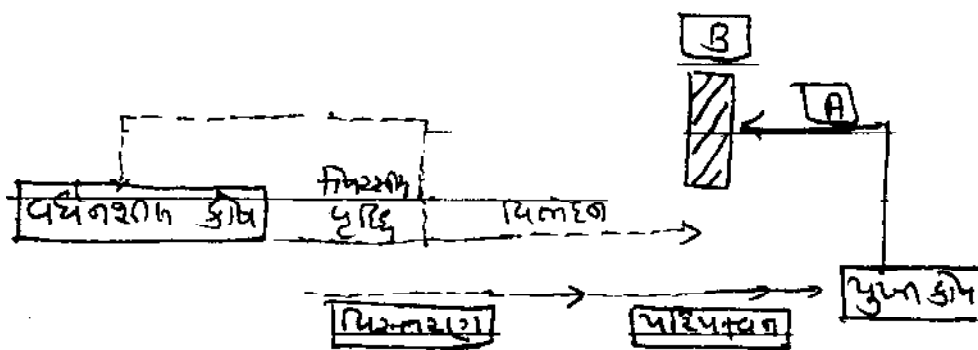
120. If cells obtain ability of cell division in certain circumstances, it is called .....

- (a) Differentiation
- (b) Cleavage
- (c) De-Deferentiation
- (d) Undifferentiation

121. In certain condition, dividing cell, loose their ability of cell division, it is called .....

- (a) Differentiation
- (b) Cleavage
- (c) De-differentiation
- (d) Undifferentiation

122. What is A and B in the given figure ?



- (a) Senescence and death
- (b) Death and senescence
- (c) Growth and death
- (d) Death and senescence

123. Which organic chemicals are included in shoot with photoperiodism ?

(AIIMS-1996)

- (a) Ethylene
- (b) Cytokinin
- (c) Auxin
- (d) Gibberrelin

124. Motor cells of leaves and grass, shows which type of movement ? (AIIMS-1996)  
 (a) Locomotory movement      (b) Growth movement  
 (c) Nastic movement          (d) Osmotic movement
125. Which activity in plant is observed due to ethylene ?  
 (a) Matutiation of leaf          (b) Maturation of fruit  
 (c) Maturation of flower        (d) Maturation of seeds
126. Which of the following type is improper for nastism ?  
 (a) Photonasty                    (b) Hydronasty  
 (c) Thermonasty                  (d) Phototropism
127. Which of the following is incorrect for tropism ?  
 (a) Phototropism                  (b) Thermotropism  
 (c) Hydrotropism                (d) Thigmotaxis
128. What is the direction of tropism ?  
 (a) Straight                        (b) Oblique  
 (c) Undirectional                (d) Directional
129. Which of the example is improper for tropic movement ?  
 (a) Volvox                            (B) Antherozoids of bryophytes  
 (c) Antherozoids of pteridophytes    (d) Mimosa
130. With, what nutation is related ?  
 (a) Autonomous movement      (b) Induced movement  
 (c) Autonomous curvature movement (d) Induced curvature movement
131. Match the list :
- | <b>Column I</b>                    | <b>Column II</b>                   |
|------------------------------------|------------------------------------|
| (P) Volvox                         | (i) Chemotaxis                     |
| (Q) Mimosa                         | (ii) Phototaxis                    |
| (R) Antherozoids of bryophytes     | (iii) Movement / tropism           |
| (S) Leaf tendril                   | (iv) Thigmotropism                 |
| (a) (P-i), (Q-ii), (R-iii), (S-iv) | (b) (P-ii), (Q-iii), (R-iv), (S-i) |
| (c) (P-ii), (Q-iv), (R-i), (S-iii) | (d) (P-iv), (Q-iii), (R-ii), (S-i) |
132. Match the list :
- | <b>Column I</b>                       | <b>Column II</b>                   |
|---------------------------------------|------------------------------------|
| (P) Plasmodium of slime mould         | (i) Ciliary movement               |
| (Q) Chlamydomonas algae               | (ii) Circular movement             |
| (R) protoplasm of tradenschantia leaf | (iii) Rotational movement          |
| (S) Protoplasm of hydrilla            | (iv) Amoeboid movement leaves      |
| (a) (P-i), (Q-ii), (R-iii), (S-iv)    | (b) (P-iv), (Q-iii), (R-iv), (S-i) |
| (c) (P-iv), (Q-i), (R-ii), (S-iii)    | (d) (P-iv), (Q-ii), (R-i), (S-iii) |

133. Match the following :

**Column I**

- (P) Zoospore of volvox  
 (Q) Antherozoids of bryophytes and pteridophytes  
 (R) Diatoms  
 (S) Zoospores in oedogonium

**Column II**

- (i) Thermo taxis  
 (ii) Thigmo taxis  
 (iii) Photo taxis  
 (iv) Chemo taxis

- (a) (P-i), (Q-ii), (R-iii), (S-iv)    (b) (P-iv), (Q-iii), (R-ii), (S-i)  
 (c) (P-iii), (Q-iv), (R-i), (S-ii)    (d) (P-iii), (Q-ii), (R-i), (S-iv)

134. Match the following :

**Column I**

- (P) Opening of leaf blade  
 (Q) Closing of leaves  
 (R) Zigzag movement in apical bud  
 (S) Spiral and helical growth of tendrilar plants  
 (T) Pulsation in leaflets of indian telegraph plant

**Column II**

- (i) Epinasty  
 (ii) Hyponasty  
 (iii) Nutation  
 (iv) Circumnutation  
 (v) Variation

- (a) (P-i), (Q-ii), (R-iii), (S-iv), (T-v)    (b) (P-v), (Q-iv), (R-iii), (S-ii), (T-i)  
 (c) (P-v), (Q-i), (R-iv), (S-iii), (T-ii)    (d) (P-v), (Q-i), (R-iv), (S-ii), (T-iii)

135. Match the list :

**Column I**

- (P) Phototropism  
 (Q) Geotropism  
 (R) Hydrotropism  
 (S) Thigmotropism

**Column II**

- (i) Water  
 (ii) Gravitation  
 (iii) Light  
 (iv) Touch

- (a) (P-i), (Q-ii), (R-iii), (S-iv)    (b) (P-iii), (Q-ii), (R-i), (S-iv)  
 (c) (P-iv), (Q-iii), (R-ii), (S-i)    (d) (P-iii), (Q-ii), (R-iv), (S-i)

136. Match the list :

**Column I**

- (P) Lotus and sunflower  
 (Q) Crocus and tulip  
 (R) Due to turgidity of leauses  
 (S) Mimosa

**Column II**

- (i) Hydronasty  
 (ii) Thigmonasty  
 (iii) Thermonasty  
 (iv) Photonasty

- (a) (P-iv), (Q-iii), (R-i), (S-iii)    (b) (P-i), (Q-ii), (R-iii), (S-iv)  
 (c) (P-ii), (Q-iii), (R-iv), (S-i)    (d) (P-i), (Q-iii), (R-ii), (S-iv)

137. Covering surrounding embryo contain growth inhibitor hormone for ..... dormancy.

- (a) Physical dormancy                      (b) Mechanical dormancy  
 (c) External dormancy                      (d) Chemical dormancy

138. In which type of dormancy, due to hardness of seed coats or integuments, embryo could not expand during germination ?  
 (a) Physical dormancy                      (b) Mechanical dormancy  
 (c) External dormancy                      (d) Chemical dormancy
139. Which type of dormancy is found when seed is impermeable to water or gaseous exchange ?  
 (a) Physical dormancy                      (b) Mechanical dormancy  
 (c) External dormancy                      (d) Chemical dormancy
140. Which type of dormancy, inhibits embryo growth and germination in seed ?  
 (a) Endogenous dormancy                  (b) Physiological dormancy  
 (c) External dormancy                      (d) Mixed dormancy
141. Which type of dormancy is found in seed causes physiology and external dormancy ?  
 (a) Mixed dormancy                          (b) External dormancy  
 (c) Physiological dormancy                  (d) Endogenous dormancy
142. What is the type of dormancy in which embryo do not differentiate into various tissue at the time of fruit maturation ?  
 (a) Internal dormancy                      (b) Physiological dormancy  
 (c) External dormancy                      (d) Mixed dormancy
143. During physiological and physical condition some changes observed in seed, is knows as .....  
 (a) Exogenous dormancy                  (b) Endogenous dormancy  
 (c) Combinational dormancy                  (d) Secondary dormancy
144. Which type of dormancy is induced in seeds due to adverse condition and high temperature ?  
 (a) Exogenous dormancy                  (b) Endogenous dormancy  
 (c) Combinational dormancy                  (d) Secondary dormancy

Asseretion - Reasoning type of questions :

A : Assertion (Statement)

R : Reason

Following option are common for questions number 145 to 157.

- (a) A and R both correct, R is explanation of A.  
 (b) A and R both correct but R is not explanation A.  
 (c) A = correct, R = false  
 (d) A = false, R = correct
145. A : Ethylene inhibits logitudinal growth of root stem and leaves.  
 R : Ethylene is growth inhibitor, maturation hormone.  
 (a)    (b)    (c)    (d)
146. A : Seed is active condensed plant.  
 R : It shows specific dormancy and get activated.  
 (a)    (b)    (c)    (d)



147. A : Adventitious roots develop by auxin in plants.  
R : Auxin, removes the dominant effect of apical bud.  
(a) (b) (c) (d)
148. A : Cytokinin is cytoplasmic hormone.  
R : Cytokinin induced cell division.  
(a) (b) (c) (d)
149. A : Nastism is unidirectional.  
R : Induced factors are essential for nastism.  
(a) (b) (c) (d)
150. A : Tropism is unidirectional.  
R : Specific modifications observed in plant due to tropism.  
(a) (b) (c) (d)
151. A : Flowering is natural phenomenon in plants.  
R : If photoperiodism is fixed, increases flowering in plants.  
(a) (b) (c) (d)



**Answer Key**

1	c	39	b	77	a	115	c
2	a	40	c	78	c	116	c
3	c	41	b	79	a	117	a
4	a	42	a	80	a	118	b
5	b	43	a	81	a	119	c
6	a	44	a	82	a	120	c
7	a	45	c	83	a	121	d
8	c	46	a	84	c	122	a
9	b	47	a	85	a	123	d
10	a	48	d	86	d	124	d
11	a	49	b	87	b	125	b
12	b	50	b	88	b	126	d
13	c	51	b	89	c	127	d
14	d	52	a	90	a	128	d
15	b	53	a	91	c	129	d
16	b	54	d	92	a	130	c
17	d	55	b	93	a	131	c
18	a	56	b	94	d	132	c
19	d	57	b	95	d	133	c
20	a	58	b	96	b	134	c
21	b	59	c	97	a	135	b
22	c	60	c	98	c	136	a
23	c	61	c	99	a	137	d
24	a	62	c	100	b	138	b
25	c	63	b	101	d	139	b
26	c	64	d	102	c	140	b
27	b	65	a	103	c	141	a
28	c	66	a	104	d	142	c
29	a	67	a	105	c	143	c
30	d	68	a	106	b	144	d
31	d	69	c	107	b	145	a
32	d	70	d	108	a	146	a
33	d	71	d	109	a	147	b
34	a	72	b	110	b	148	d
35	a	73	c	111	d	149	a
36	d	74	a	112	c	150	c
37	b	75	b	113	d	151	b
38	a	76	b	114	d		

## Unit-V

### Chapter-19. Digestion and Absorption

#### IMPORTANT POINTS

- The biochemical process in which complex food converts into simple and absorbable substance with the help of digestive enzymes is called digestion.
- The diet substances include carbohydrates, lipids, proteins, vitamins, minerals and water.
- The human digestive track include mouth, pharynx, oesophagus, stomach, duodenum, small intestine, rectum and anal canal. Besides these certain accessory digestive glands like liver and pancreas are incorporate (d)
- In the process of digestion five types of gastric juices, enzyme and other substances are helps. In which saliva secrets from salivary gland, gastric

(1) Which enzyme is required for conversion of complex component to simple component ?

- (A) Hydrolytic      (B) Migratory      (C) Adhesives      (D) Convertor

(2) Which components are assimilated in their original forms ?

- (A) Carbohydrate and Lipid      (B) Minerals and Vitamins  
(C) Protein and Fat      (D) All above

(3) Which is the descending sequence of human digestive track ?

- (A) Mouth, Oesophagus, Small intestine, Stomach, Large intestine  
(B) Mouth, Pharynx, Stomach, Duodenum, Small intestine  
(C) Pharynx, Stomach, Duodenum, Oesophagus, Anal canal  
(D) Oesophagus, Large intestine, Small intestine, Rectum, Anal canal

(4) What is the numbers of teeth in 5 years old child ?

- (A) 10      (B) 16      (C) 32      (D) 20

(5) What is the numbers of teeth in the lower jaw of 5 years old child ?

- (A) 10      (B) 8      (C) 16      (D) 5

(6) What is the dental formula of teeth in 5 years old child ?

- (A)  $\frac{2123}{2123}$       (B)  $\frac{2103}{2103}$       (C)  $\frac{2003}{2003}$       (D)  $\frac{2120}{2120}$

(7) How many total teeth are present in human jaw ?

- (A) 16      (B) 20      (C) 32      (D) 34

(8) How many total teeth are present in the lower jaw of human ?

- (A) 32      (B) 10      (C) 8      (D) 16

(9) Which teeth are not present in the jaws of little child ?

- (A) Canine      (B) Premolar      (C) Molar      (D) Incisor

- (10) By which name the joint of teeth in jaws is known ?  
 (A) Heterodont      (B) Thecodont      (C) Diphyodont      (D) All above
- (11) Where does our mouth open ?  
 (A) Body cavity      (B) Buccal cavity      (C) Pharynx      (D) Oesophagus
- (12) Presence of different types of teeth is known as.....  
 (A) Thecodont      (B) Diphyodont      (C) Heterodont      (D) Permanent teeth
- (13) By what the crown of teeth is made of ?  
 (A) Dentine      (B) Enamel      (C) Cement      (D) Aereolar
- (14) Which layer is not present in the teeth ?  
 (A) Pulp      (B) Dentin      (C) Mucous      (D) Crown
- (15) Which part of teeth possesses nerve and blood vessel ?  
 (A) Pulp      (B) Dentin      (C) Crown      (D) All abavs
- (16) Which type of teeth Human possesses ?  
 (A) Thecodont, Heterodont      (B) Thecodont, bilateral  
 (C) Heterodont, Diphyodont      (D) Thecodont, Temporary
- (17) Where does our Buccal cavity open ?  
 (A) Oesophagus      (B) Salivary gland      (C) Pharynx      (D) Stomach
- (18) By which structure tongue is attached with lower region of buccal cavity in human?  
 (A) Bony      (B) Frenulum      (C) Muscular      (D) Fibrous
- (19) Mention the correct pair for test bud present in the tongue.  
 (A) Fungiform, Filiform      (B) Vallate, Simplicies  
 (C) Filiform, Complex      (D) A and B both
- (20) Which of the following acts as a salivary gland ?  
 (A) Submandidular gland, Sublingual gland, Parotid gland  
 (B) Sublingual gland, SubParotid gland, Subclavian gland  
 (C) Parotid gland, Portal gland, Submandibular gland  
 (D) Subclavian gland, SubParotid gland, Sublingual gland
- (21) Which is the largest salivary gland of human ?  
 (A) Sublingual gland      (B) Submandibular gland  
 (C) Parotid gland      (D) SubParotid gland
- (22) Where the Submandibular gland is located ?  
 (A) Under the teeth      (B) Under the bones of jaw  
 (C) Under the toungue      (D) Anterior region of toungue
- (23) Where the Sublingual gland is located ?  
 (A) Lower region of toungue      (B) Under membrane of the toungue  
 (C) Under the toungue      (D) Anterior region of toungue

- (24) What is the approximate length of pharynx in human ?  
 (A) 25 cm            (B) 12.5 cm            (C) 11.5 cm            (D) 15.5 cm
- (25) What is the length of Oesophagus in human ?  
 (A) 12 to 15 cm    (B) 12.5 to 15.5 cm (C) 23 to 25 cm    (D) 20 to 28 cm
- (26) Which structure is present at the joining of small intestine and large intestine ?  
 (A) Sphincter muscle valve                      (B) Ileo- colic valve  
 (C) Pyloric valve                                      (D) Muscular inhibiting valve
- (27) Duodenum is a part of .....  
 (A) Stomach            (B) Oesophagus            (C) Digestive track    (D) Small Intestine
- (28) Which duct opens in Duodenum ?  
 (A) Bile duct            (B) Pancreatic duct    (C) Lingual duct            (D) A and B both
- (29) By which name the longest convoluted part of small intestine is known ?  
 (A) Midgut            (B) Ileum            (C) Foregut            (D) Hindgut
- (30) What are the approximate lengths of large intestine and small intestine respectively in human ?  
 (A) 1.5 meter and 2 to 4 meter            (B) 2 to 4 meter and 1.5 meter  
 (C) 7 meter and 5 meter            (D) 5 meter and 7 meter
- (31) From where the large intestine starts ?  
 (A) Foregut    (B) Intestinal caecum            (C) Appendix            (D) Ileum
- (32) Which of the following is the smallest digestive duct ?  
 (A) Oesophagus    (B) Large Intestine    (C) Pharynx            (D) Small Intestine
- (33) The layers of wall of digestive duct from inner to outer are.....  
 (A) Muscular layer, Submucosa, Serosa, Mucosa  
 (B) Serosa, Submucosa, Mucosa, Muscular layer  
 (C) Mucosa, Submucosa, Muscular layer, Serosa  
 (D) Mucosa, Muscular layer, Submucosa, Serosa
- (34) Which layer surrounds the cavity of digestive track ?  
 (A) Serosa            (B) Muscular layer            (C) Submucosa    (D) Mucosa
- (35) By what the muscular layer is surrounded ?  
 (A) Serosa and Mucosa            (B) Serosa and SubMucosa  
 (C) Mucosa and SubMucosa    (D) ) Mucosa and Serosa
- (36) What are Goblet cells ?  
 (A) Mucus secreting cells            (B) Absorbing cells  
 (C) Enzyme secreting cells            (D) Phagocytic cells
- (37) By which tissue membrane, liver is covered ?  
 (A) Areolar tissue            (B) Epidermal tissue  
 (C) Connective tissue            (D) Muscle tissue

- (38) In which organ bile juice produced ?  
 (A) Liver (B) Gall bladder (C) Pancreas (D) Duodenum
- (39) In which organ bile juice functions?  
 (A) Liver (B) Gall bladder (C) Pancreas (D) Duodenum
- (40) Where the digestion of food is started ?  
 (A) Oesophagus (B) Pharynx (C) Stomach (D) Buccal cavity
- (41) Which enzymes are in the composition of gastric juice ?  
 (A) Ptylin, Renin, Lipase (B) Pepsin, Ptylin, Renin,  
 (C) Lipase Pepsin, Renin, (D) Ptylin, Lipase, Pepsin
- (42) Who digests Starch ?  
 (A) Ptylin (B) Pepsin (C) Trypsin (D) Renin
- (43) Function of lysozyme.....  
 (A) Anti bacterial agent (B) Absorption  
 (C) Digestion of lipid (D) Transport of food
- (44) Which is the important enzymes of gastric juice ?  
 (A) Renin (B) Lipase (C) Pepsin (D) Ptylin
- (45) By what Trypsinogen is converted into Trypsin ?  
 (A) Oxantic cells (B) Enterokinase (C) Bicarbonate salts (D) Chyme
- (46) What is digested by trypsin ?  
 (A) Protein (B) Lipid (C) Carbohydrate (D) All Above
- (47) Protein  
 (A) Polypeptide, Amino acids (B) Proteoses, Peptons  
 (C) Polypeptide, Peptons (D) Polypeptide, Disaccharides
- (48) Protein  
 (A) Diglyceraldehydes, Monoglyceraldehydes (B) Glycerol, Fatty acids  
 (C) Polypeptide, Amino acids (D) Dipeptide, Amino acids
- (49) Lipids  
 (A) Diglyceraldehydes, Monoglyceraldehydes (B) Dinucleotides, Mononucleotides  
 (C) Dipeptide, Peptides (D) Fatty acids, Amino acids
- (50) Maltose  
 (A) Glucose, Fructose (B) Glucose, Galactose  
 (C) Glucose, Sucrose (D) Glucose, Glucose
- (51) Which enzymes converts Monoglyceral-dehydes into fatty acids and glycerol ?  
 (A) Protease (B) Sucrase (C) Maltase (D) Lipase
- (52) Components which is responsible for stimulation of juice.  
 (A) HCl (B) Gastrin (C) Enterogastrone (D) Erepsin
- (53) What product can be obtained by erepsin ?  
 (A) Glucose (B) Amino acid (C) Trypsin (D) Glycerol

- (54) By which process water is transported ?  
 (A) Osmosis (B) Diffusion (C) Active transport (D) Passive transport
- (55) Which gland in our digestive system has compound racemose structure ?  
 (A) Liver (B) Salivary gland (C) Pancreas (D) Duodenum
- (56) Which hormones are secreted by Pancreas ?  
 (A) Prolectin, Insulin (B) Insulin, Glucagon  
 (C) Secretin, Glucagon (D) Bilirubin, Prolectin
- (57) Hydrolyzing the complex components into small size with the help of enzyme means...  
 (A) Assimilation (B) Ingestion (C) Digestion (D) Absorption
- (58) In the absorption of which component no difficulties arise ?  
 (A) Amino acid (B) Fructose (C) Fatty acid (D) Glycerol
- (59) The characteristic of colitis is.....  
 (A) Watery stool with blood and mucus (B) Lack of food absorption  
 (C) Faeces are not moved ahead in the rectum (D) Swelling in stomach
- (60) Not connected with peptic ulcer.....  
 (A) Irregular diet (B) indigestion (C) Mental stress (D) Pressure of emotion
- (61) What is colitis ?  
 (A) Constipation (B) Hepatitis (C) Ulcer in colon (D) Swelling in colon
- (62) What is ulcerative ?  
 (A) Swelling in colon (B) Swelling in stomach  
 (C) Ulcer in colon (D) Ulcer in stomach
- (63) What is the causes of gastritis ?  
 (A) Swelling in stomach (B) Effect of gastric juice  
 (C) Swelling in colon (D) Toxic effect in digestive track
- (64) Digestion related diseaes in which liver is effected ?  
 (A) Indigestion (B) Hepatitis (C) Colitis (D) Ulcerative
- (65) In which organ of digestive track hydrolysis of starch into maltose take place ?  
 (A) Stomach (B) Liver (C) Duodenum (D) Mouth
- (66) Pancreas is an endocrine as well as exocrine gland because  
 (A) It secretes insulin and glucagon hormones (B) It secretes alkaline pancreatic juice  
 (C) It is very much similar to the structure of salivary gland (D) A and B both
- (67) Improper sentence for liver...  
 (A) It carries 1.2 to 1.5 Kg weight in adult human (B) It like compound racemose gland  
 (C) It lockated in abdominal cavity. (D) It is divided into left and right lobes.
- (68) Mention the improper sentence from following :  
 (A) Bile juice emulsifies the fat.  
 (B) Chyme is a digestive acidic food in stomach.  
 (C) Pancreatic juice converts lipid into fatty acid and glycerol.  
 (D) Endogastrin stimulates the secretion of gastric juice.

(69) Complex components are not absorbed by digestive track because.....

- (A) They are large in size.      (B) Their molecular weights is high.  
 (C) They are insoluble.      (D) A and B both

(70) What are chyme particles....

- (A) The process of conversion of fat into small droplets.  
 (B) The process of conversion of Micelles substances of glycerol into fatty droplet.  
 (C) The process of preparation of incompletely digested acidic food through gastric juice  
 (D) The process of preparation of completely digested liquid food in midgut.

(71) Improper sentence for hepatitis...

- (A) Eyes are seen yellow due to increased amount of bile pigments.  
 (B) Toxic effect or moving effect in digestive track is responsible.  
 (C) The liver cells fail to excrete bile.  
 (D) Obstacle occurred in bile duct.

(72) Make the correct pairs

- | <b>Column - I</b>   | <b>Column - II</b>                   |                                     |
|---------------------|--------------------------------------|-------------------------------------|
| (P) Small intestine | (i) Largest factory                  | (A) (P-iv) (Q -iii) (R- i) (S - ii) |
| (Q) Pancreas        | (ii) Absorption of glucose           | (B) (P-iii) (Q -ii) (R- i) (S - iv) |
| (R) Liver           | (iii) Carrying electrolytic solution | (C) (P-iv) (Q -iii) (R- i) (S - ii) |
| (S) Colon           | (iv) Digestion and absorption        | (D) (P-ii) (Q -iv) (R- iii) (S - i) |

(73) Make the correct pairs

- | <b>Column - I</b>   | <b>Column - II</b> |  |
|---------------------|--------------------|--|
| (P) Small intestine | (i) 23 cm          | (A) ( P-iv ) ( Q -ii ) ( R- i ) ( S - iii) |
| (Q) Large intestine | (ii) 4 meter       | (B) ( P-ii ) ( Q -iv ) ( R- i ) ( S - iii) |
| (R) Oesophagus      | (iii) 12.5 cm      | (C) ( P-i ) ( Q -iii ) ( R- ii ) ( S - iv) |
| (S) Pharynx         | (iv) 1.5 meter     | (D) ( P-iii ) ( Q -i ) ( R- ii ) ( S - iv) |

(74) Make the correct pairs

- | <b>Column - I</b> | <b>Column - II</b> |  |
|-------------------|--------------------|--|
| (P) Lipase        | (i) Starch         | (A) ( P-iv ) ( Q -ii ) ( R- i ) ( S - iii) |
| (Q) Pepsin        | (ii) Cassein       | (B) ( P-iii ) ( Q -iv ) ( R- ii ) ( S - i) |
| (R) Renin         | (iii) Protein      | (C) ( P-iv ) ( Q -iii ) ( R- ii ) ( S - i) |
| (S) Ptylin        | (iv) Lipid         | (D) ( P-iii ) ( Q -ii ) ( R- iv ) ( S - i) |

(75) Make the correct pairs

- | <b>Column - I</b> | <b>Column - II</b>                    |                                    |
|-------------------|---------------------------------------|------------------------------------|
| (P) Kwashiorkor   | (i) Indigestion                       | (A) (P-iii) (Q -iv) (R- ii) (S -i) |
| (Q) Gastritis     | (ii) More production of bile pigments | (B) (P-iv) (Q -iii) (R- ii) (S-i)  |
| (R) Hepatitis     | (iii) Malnutrition                    | (C) (P-ii) (Q -iii) (R- iv) (S -i) |
| (S) Constipation  | (iv) Effects of food toxicity         | (D) (P-i) (Q -iii) (R- iv) (S -i)  |



- (76) How pepsin is differing from trypsin ? (DPMT - 1993)  
 (A) It digests protein in acidic medium (B) It digests protein in alkaline medium  
 (C) It digests carbohydrate in acidic medium (D) It digests carbohydrate in alkaline medium
- (77) Human intestine large because..... (DPMT - 1996)  
 (A) Bacteria in the food moves slowly  
 (B) Substances of food digest slowly  
 (C) It provide more space for the absorption of digested food  
 (D) It provide more space for the storage of food
- (78) How the epidermal cells in the stomach of vertebrate animal is protect stomach again HCl ? (NCERT -1981)  
 (A) HCl is dilute (B) Epidermal cells defense the function of HCl  
 (C) HCL is neutralized in stomach (D) Epidermal cells covered with secretion of mucous
- (79) By what the major part of mammalian teeth is made up ? (CPMT - 1984)  
 (A) Root (B) Pulp (C) Dentin (D) Enamel
- (80) Enterokinase takes part in the conversion of what ? ( BHU-2000)  
 (A) Pepsinogen into pepsin (B) Trypsinogen into trypsin  
 (C) Protein into polypeptide (D) Caseinogen into casein
- (81) Secretin stimulates production of ( M.P.P.M.T. 2002)  
 (A) Saliva (B) Gastric juice (C) Bile (D) Pencreatic juice
- (82) Pepsin acts in (H.P.P.M.T.-2001)  
 (A) Basic meduim (B)Acidic meduim (C) Neutral meduim (D) All type of meduim
- (83) Enzyme trypsin is secreted by ( A.F.M.C. -2003)  
 (A) Duodenum (B) Liver (C) Pancreas (D) Stomach
- (84) Dental formula of adult human is (Orissa -2004)  
 (A) (B) (C) (D)
- (85) The number of teeth that grow twice in the human life is (A.F.M.C. -2002,2004)  
 (A) 4 (B) 12 (C) 20 (D) 28
- (86) The number of teeth that grow once in the human life is (D.P.M.T, B.H.U.- 1986)  
 (A) 4 (B) 12 (C) 20 (D) 28
- (87) Cholesterol is synthesised in (M.P.P.M.T. - 2000)  
 (A) Brunner's glands (B) Liver (C) Spleen (D) Pancreas
- (88) Largest gland in human body is ( J.K. C.M.E.E- 2003)  
 (A) Liver (B) Pancreas (C) Pituitary (D) Thyroid
- (89) Muscular contraction of alimentary canal are ( C.M.C- 2003)  
 (A) Circulation (B) Deglutition (C) Churning (D) Peristalsis
- (90) Fatty acids and glycerol are first absorbed by (B.V.- 2000)  
 (A) Lymph vessels (B) Villi (C) Blood capillaries (D) Hepatic portal vein

- (91) Trypsin changes (M.P.P.M.T. - 1995)  
 (A) Proteins into peptones (B) Fats into fatty acids  
 (C) Starch and glycogen into maltose (D) Maltose into its components
- (92) Secretin hormone is produced by (M.P.P.M.T. - 1995)  
 (A) Stomach (B) Liver (C) Intestine (D) Pancreas
- (93) Narrow distal part of stomach is (M.P.P.M.T. - 1995)  
 (A) Cardiac (B) Pharynx (C) Duodenum (D) Pylorus
- (94) pH suitable for ptyalin actions is (A.F.M.C. -1996)  
 (A) 6 - 8 (B) 7 - 8 (C) 3 - 2 (D) 9 - 3
- (95) What will happen if bile duct gets choked ? (D.P.M.T. - 1996)  
 (A) Faeces become dry (B) Acidic chyme will not be neutralised  
 (C) There will be little digestion in intestine (D) Little absorption of fat will occur
- (96) Digestion of both starch and protein is carried out by (A.F.M.C. -1996)  
 (A) Gastric juice (B) Gastric lipase (C) Pancreatic juice (D) Ptylin
- (97) What is common among amylase,renin and trypsin ? (C. P. M.T. -2000)  
 (A) All proteins (B) Proteolytic enzymes  
 (C) Produced in stomach (D) Act at pH lower then 7
- (98) Enterokinase is (B.H.U. -1997)  
 (A) Pancreatic hormone (B) Intestine hormone  
 (C) Pancreatic enzyme (D) Component of Intestinal juice
- (99) Which enzyme initiates protein digestion ? (M.P. P. M.T. -1997)  
 (A) Pepsin (B) Trypsin (C) Aminopeptidase (D) Carboxypeptidase
- (100) Enzyme which does not directly act upon food substrate is (Karnataka -1997)  
 (A) Trypsin (B) Lipase (C) Enterokinase (D) Amylopsin
- (101) Pepsin is secreted by (C. P. M.T. -1997)  
 (A) Peptic cells (B) Zymogen cells of stomach  
 (C) Zymogen cells of duodenum (D) Pancreas
- (102) Pepsinogen is activated by (Orissa -1997)  
 (A)Chymotrypsin (B) Trypsin (C) HCl (D) Pepsin
- (103) Contraction of gall bladder is induced by (C.B.S.E. -1998)  
 (A) Gastrin (B) Cholecystokinin (C) Secretin (D) Enterogastrone
- (104) Hormone that stimulates stomach to secrete gastric juice is (C.B.S.E. -1998)  
 (A) Renin (B) Enterokinase (C) Enterogastrone (D) Gastrin
- (105) Water is largely absorbed in (C. P. M.T. -1999)  
 (A) Stomach (B) Oesophagus (C) Small intestine (D) Colon
- (106) HCl is secreted by (D. P. M.T. -2002)  
 (A) Zymogen cells (B) Kupffer's cells (C) Oxyntic cells (D) Mucous cells

- (107) Jundice is a disease of (A. P. M.E.E. -1999)  
 (A) Kidney (B) Liver (C) Pancreas (D) Duodenum
- (108) Which is different ? (B.H.U. -1999)  
 (A) Gastrin (B) Secretin (C) Ptyalin (D) Glucagon
- (109) Gastrin is (B.H.U. -1999)  
 (A) Hormone (B) Enzyme (C) Nutrient (D) Digestive secretion
- (110) Saliva contains enzyme (C. P. M.T. -2003)  
 (A) Enterokinase (B) Ptyalin/ Amylase (C) Chymotrypsin (D) Lipase
- (111) In human being cellulose is digested by (Karnataka -1999)  
 (A) Enzyme (B) Symbiotic bacteria  
 (C) Symbiotic protozoans (D) None of the above
- (112) Enzyme lactase occurs in (M.P.P.M.T. -2000)  
 (A) Saliva (B) Pancreatic juice (C) Intestinal juice (D) Stomach
- (113) Protein / enzyme is absent in (M.P.P.M.T. -2000)  
 (A) Saliva (B) Bile (C) Pancreatic juice (D) Intestinal juice
- (114) Dental formula shows (M.P.P.M.T. -2000)  
 (A) Structure of teeth (B) Monophyodont or diphyodont condition  
 (C) Number and type of teeth in both jaws  
 (D) Number and type of teeth in one half of both jaws
- (115) pH of gastric juice / stomach is (Orissa-2003)  
 (A) 1.5 -3.0 (B) 5.0 - 6.8 (C) 7.0 - 9.0 (D) 6.0 -8.0
- (116) In case of taking food rich in lime juice, the action of ptylin on starch is  
 (A) Enhanced (B) Reduced (C) Unaffected (D) Stopped (A.I.I.M.S. -2000)
- (117) Bile salts take part in (A.M.U. -2000)  
 (A) Digestion of carbohydrates (B) Brokedown of proteins  
 (C) Emulsification of fat (D) Absorption of glycerol
- (118) Digestive juice contains catalytic agents called (Pb.P.M.T. -2000)  
 (A) Vitamins (B) Hormones (C) Enzymes (D) Nitrates
- (119) Which is not the function of liver (D.P.M.T. -2001)  
 (A) Production of insulin (B) Detoxification  
 (C) Storage of glycogen (D) Production of bile
- (120) Fat absorbed from gut is transported in blood as (Kerala -2001)  
 (A) Micelles (B) Liposomes (C) Chemomicrons (D) Chlymicrons
- (121) In small intestine, active absorption occurs in case of (A.M.U. -2001)  
 (A) Glucose (B) Amino acids (C) Na<sup>+</sup> (D) All the above
- (122) Which one is not matched (Har.P.M.T. -2002)  
 (A) Pepsin - stomach (B) Renin - liver (C) Trypsin - intestine (D) Ptyalin - mouth

- (123) What is cholecystikinin (Orissa -2002)  
 (A) Bile pigment (B) Gastro-intestinal hormone (C) Enzyme (D) Lipid
- (124) Secretion of gastric juice is controlled by (C.P.M.T. -2002)  
 (A) Enterogesterone (B) Cholecystokinin (C) Gastrin (D) Pepsin
- (125) Which one is wisdom teeth (C.P.M.T. -2002)  
 (A) Third molar, four in number (B) Third molar, two in number  
 (C) Second molar, four in number (D) Second molar, two in number
- (126) In humans, digestion is (B.H.U. -2002)  
 (A) Intercellular (B) Intracellular (C) Extracellular (D) Both A and B
- (127) Gall bladder takes part in (R.P.M.T. -2002)  
 (A) Secretion of bile (B) Storage of bile  
 (C) Formation of bile salts (D) Formation of enzymes
- (128) Rennin acts on milk protein and changes (J.I.P.M.E.R. -2002)  
 (A) Caesinogen into caesin (B) Caesin into paracaesin  
 (C) Caesinogen into paracaesin (D) Paracaesin into Caesinogen
- (129) Glucose is stored in liver as (A.F.M.C. -2003)  
 (A) Starch (B) Glycogen (C) Cellulose (D) Sucrose
- (130) Absorption of glycerol, fatty acids and monoglycerides takes place by  
 (A) Lymph vessels within villi (B) Walls of stomach (Karnataka-2003)  
 (C) Colon (D) Capillaries within villi
- (131) Which ones are bile salts (Karnataka-2003)  
 (A) Haemoglobin and biliverdine (B) Bilirubin and biliverdine  
 (C) Bilirubin and Haemoglobin (D) Sodium glycolate and taurocholate
- (132) Ptylin is inactivated by a component of gastric juice called (Har.P.M.T. -2003)  
 (A) Pepsin (B) HCl (C) Rennin (D) Mucus
- (133) Epithelial cells involved in absorption of digested food have on their free surface.  
 (A) Zymogen grannules (B) Pinocytic vesicles (A.I.E.E.E.-2003)  
 (C) Phagocytic vesicles (D) Microvilli
- (134) First step in digestion of fat is (B.H.U. -2003)  
 (A) Emulsification (B) Enzyme action  
 (C) Absorption by lacteals (D) Storage in adipose tissue
- (135) DNA-ase and RNA-ase are enzymes produced by (B.H.U. -2003)  
 (A) Salivary glands (B) Pancreas (C) Stomach (D) Intestine
- (136) Carboxypeptidase is secreted by (Kerala-2004)  
 (A) Pancreas (B) Stomach (C) Salivary glands (D) Intestine
- (137) Secretin and Cholecystokinin are digestive hormone, They are Secreted in  
 (A) Pyloric stomach (B) Duodenum (C) Ileum (D) Oesophagus (CBSE -2005)

- (138) Crown of teeth is covered by (AFMC-2005)  
 (A) Dentin (B) Enamel (C) A and B both (D) Non of these
- (139) Both the crown and root of a tooth is covered by a layer of bony hard substance called (J&K CET-2005)  
 (A) Enamel (B) Dentin (C) Bony socket (D) Cementum
- (140) Lysozymes are found in (MPPMT-2004)  
 (A) Saliva (B) Tears (C) A and B both (D) Mitochondria
- (141) Which of the following is not present in pancreatic juice (HPPMT-2005)  
 (A) Trypsinogen (B) Chymotrypsin (C) Parasitic (D) lipase  
 A. Both A and R are true and R is correct explanation of A  
 B. Both A and B are true but R is not the correct explanation of A  
 C. A is true but R is false  
 D. A is false but R is true
- (142) A : Many tube like glands are present in the wall of small intestine.  
 R : These glands secrete enzyme DNase and RNase into the intestinal juice.  
 (A) A (B) (C) (D)
- (143) A : Large intestine also shows the presence of villi like small intestine.  
 R : Absorption of water takes place in large intestine.  
 (A) (B) (C) (D)
- (144) A : Thick layers of muscles are present in the wall of alimentary canal.  
 R : These muscles help in the mixing of food materials with the enzymes coming from different glands in the alimentary canal.  
 (A) (B) (C) (D)
- (145) A : Carbohydrates are more suitable for the production of energy in the body than proteins and fats.  
 R : Carbohydrates can be stored in the tissues as glycogen for use in the production of energy, whenever necessary.  
 (A) (B) (C) (D)
- (146) A : The main part of carbohydrate digestion takes place in small intestine.  
 R : Here pancreatic amylase converts carbohydrate into lactose.  
 (A) (B) (C) (D)
- (147) A : Starch is hydrolysed by ptyalin to maltose.  
 R : Sucrase hydrolyses sucrose to lactose.  
 (A) (B) (C) (D)
- (148) A : Absorption of digested food mainly occurs in the stomach.  
 R : Stomach produces the hormone gastrin and the intrinsic factor and it liquifies ingested food.  
 (A) (B) (C) (D)

**ANSWER**

1	b	41	c	81	d	121	d
2	a	42	a	82	b	122	b
3	b	43	a	83	c	123	b
4	d	44	c	84	d	124	c
5	a	45	b	85	c	125	c
6	d	46	a	86	b	126	c
7	c	47	b	87	d	127	b
8	d	48	c	88	a	128	a
9	c	49	a	89	d	129	b
10	b	50	d	90	a	130	a
11	b	51	d	91	a	131	b
12	c	52	b	92	c	132	b
13	b	53	b	93	d	133	d
14	c	54	a	94	a	134	a
15	a	55	c	95	b	135	b
16	c	56	b	96	d	136	a
17	c	57	c	97	a	137	b
18	b	58	d	98	d	138	b
19	d	59	a	99	a	139	b
20	a	60	b	100	a	140	c
21	c	61	c	101	b	141	a
22	b	62	a	102	b	142	c
23	c	63	a	103	c	143	d
24	d	64	d	104	b	144	a
25	c	65	d	105	d	145	d
26	b	66	d	106	d	146	c
27	d	67	d	107	c	147	c
28	d	68	c	108	b	148	d
29	b	69	d	109	c		
30	a	70	b	110	a		
31	d	71	b	111	b		
32	c	72	a	112	d		
33	c	73	b	113	c		
34	d	74	c	114	b		
35	b	75	a	115	d		
36	a	76	a	116	a		
37	c	77	d	117	b		
38	b	78	d	118	c		
39	d	79	c	119	a		
40	d	80	b	120	a		



## Unit-V

### Chapter 20. Breathing and Exchange of Gases

#### IMPORTANT POINTS

- Removal of  $\text{CO}_2$  and intaking  $\text{O}_2$  is essential for cells during various processes in the body of organisms to take  $\text{O}_2$  is inspiration and removing  $\text{CO}_2$  is expiration processes. Both together called as breathing.
- In human for breathing activity nose, pharynx, larynx, trachea, bronchi and lungs like organs make together respiratory system.
- Diaphragm and intercostal muscles play important role in inspiration and expiration process.
- In exchange and transport of respiratory gases  $\text{O}_2$  and  $\text{CO}_2$  both are transported, in this blood play important role.
- The process of respiration is regulated by nervous system and chemical
- Disorders of Respiratory system are Asthma, Emphysema, Occupational Respiratory Disorders.

- (1) Respiration is helpful in
 

(a) Removing waste from the body	(b) Producing energy within the body
(c) Production of proteins	(d) Production of carbohydrates.
- (2) Respiration, occurs in the presence of oxygen is called
 

(a) Fermentation	(b) Anaerobic respiration
(c) Glycolysis	(d) Aerobic respiration
- (3) The surface, from which the exchange of gas takes place, is called
 

(a) Plasma surface	(b) Respiratory substrates
(c) Respiration surface	(d) Gaseous surface.
- (4) During respiration.....
 

(a) $\text{O}_2$ is produced and $\text{CO}_2$ is consumed	(b) $\text{O}_2$ is consumed and $\text{CO}_2$ is produced
(c) Both $\text{O}_2$ and $\text{CO}_2$ are produced	(d) Both $\text{O}_2$ and $\text{CO}_2$ are consumed.
- (5) A respiratory surface must be ?
 

(a) Thin	(b) Moist	(c) Wide spread	(d) All these.
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- (6) Which of the following shows pulmonary respiration
 

(a) Sponge	(b) Fishes	(c) Coelenterate	(d) Human
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- (7) What is called the Upper region of Pharynx in man ?
 

(a) Oropharynx	(b) Nasopharynx	(c) Laryngopharynx	(d) None of these
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- (8) The diameter of human trachea is about
 

(a) 1 cm	(b) 2.5 cm	(c) 2 inches	(d) 0.1 cm
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- (9) The length of human trachea is about (Gujarat C.E.T.Q.B.)  
 (a) 6 inches (b) 12 cm (c) 12 inches (d) 18 cm
- (10) The trachea is supported by, cartilaginous rings, which are.....shaped  
 (a) C (b) L (c) O (d) S
- (11) Sound production in humans is controlled by  
 (a) Nares (b) Lungs (c) Larynx (d) Pharynx
- (12) A lung contains many small balloon like air sacs. are called.....  
 (a) Gas spaces (b) Alveoli (c) Bronchi (d) Bronchioles
- (13) The intake of air is called ?  
 (a) Venitlation (b) Inhalation (c) Exhalation (d) Respiration.
- (14) Intercostal muscles regulate the movement of  
 (a) Ribs (b) Trachea (c) Diapharagm (d) Pharynx.
- (15) The muscles present between ribs are called  
 (a) Phrenic muscles (b) Intercoslal muscles  
 (c) Cardiac muscles (d) Voluntary muscles.
- (16) During exhalation, the diaphragm moves  
 (a) Apart (b) Downwards (c) Upwards (d) Inwards
- (17) Respiratory control centres are loacted in  
 (a) Lungs (b) Medulla oblongata (c) Spinal cord (d) Ribs
- (18) The de-oxygenated blood from heart comes to the lungs by  
 (a) Pulmonary artery (b) Pulmonary vein (c) Branchial artery (d) Renal artery
- (19) Oxygen containing blood transported from lungs is to heart by  
 (a) Pulmonary artery (b) Pulmonary vein (c) Branchial artery (d) Renal vein
- (20) How much fraction of oxygen is transported to tissues through RBCs?  
 (a) 100% (b) 56% (c) 45% (d) 97%.
- (21)  $H_2CO_3$  is converted into  $CO_2$  and  $H_2O$  with the help of an enzyme known as  
 (a) Carboxylase (b) Carbonic dehydrogenase  
 (c) Carbonicnhydrase (d) Carbonic anhydrase.
- (22) The metal ion present in haemoglobin is  
 (a) Iron (b) Magnesium (c) Copper (d) Zinc
- (23) One RBC can transport about how many molecles of oxygen?  
 (a) One million (b) Ten million (c) One billion (d) Ten billion
- (24) How many percentage of  $CO_2$  transport in the form of carbamino compounds ?  
 (a) 70% (b) 90% (c) 5% (d) 20%
- (25) The largest amount of  $CO_2$  is transported in blood as  
 (a) Carbamino compounds (b) Bicarbonates  
 (c) Carbonic acid (d) Carbonate ions.



- (26) Chloride back-shift is associated with the transport of  
 (a) Carbamino (b) CO<sub>2</sub> (c) Oxygen (d) Water
- (27) CO<sub>2</sub> reacts with water to form  
 (a) Haemoglobinic acid (b) Carbonic acid  
 (c) Bicarbonate ions (d) Carbon mono oxide.
- (28) Bronchitis is a  
 (a) Bacterial infection (b) Viral infection  
 (c) Protozoan infection (d) Fungal infection.
- (29) Asthma is a disease of  
 (a) Pharynx (b) Trachea and its branches  
 (c) Lungs (d) Blood capillaries
- (30) Flattening of alveolar ducts (tracheal vessels) results in  
 (a) Asthma (b) Emphysema (c) Lung cancer (d) Bronchitis.
- (31) Which of these protects the larynx  
 (a) Pharnx (b) Trachea (c) Epiglottis (d) Naso-pharynx.
- (32) Trachea terminates in  
 (a) Bronchi (b) Alveoli (c) Bronchioles (d) Nares
- (33) In which form CO<sub>2</sub> is not transported by blood plasma  
 (a) NaHCO<sub>3</sub> (b) KHCO<sub>3</sub> (c) Carbamino proteins (d) KHbO<sub>2</sub>
- (34) Which one is not viral infection  
 (a) Vocational lung disease (b) Bronchitis  
 (c) Asthma (d) Emphysema.
- (35) In which case specific gases, chemicals or suspended particulate matter in air are not responsible for this disease  
 (a) Silicosis (b) Asbestosis (c) Fibrosis (d) Pneumonia
- (36) They respire through lungs  
 (a) Fish (b) Cockroaches (c) Crocodiles (d) Earthworms
- (37) The muscles take part in rapid breathing  
 (a) Muscles of rib cage  
 (b) Muscles of neck region and abdominal region  
 (c) Thoracic and abdominal muscles  
 (d) Muscles of neck region and thoracic region.
- (38) Human lungs are situated in  
 (a) Abdominal cavity (b) Thoracic cavity (c) Inside diaphragm (d) Abdominal cavity
- (39) Blockage in respiratory passage in humans is prevented due to the presence of  
 (a) Epiglottis (b) Larynx  
 (c) Alveoli (d) 'C' shaped cartilagenous rings.

- (40) In human beings  
 (a) Left lung is slightly smaller (b) Left lung is slightly wider  
 (c) Right lung is slightly smaller (d) Both lungs are of similar size.
- (41) The left lung is slightly smaller so as  
 (a) It is exception (b) No specific reason  
 (c) Both A and B (d) To accommodate heart.
- (42) In which disease lung tissue degenerate?  
 (a) Bronchitis (b) Pneumonia (c) Asthma (d) Emphysema.
- (43) Which is the lung disorder related to profession?  
 (a) Silicosis (b) Emphysema (c) Pneumonia (d) Asthma
- (44) This disease is due to first virus infection followed by bacterial attack  
 (a) Asthma (b) Bronchitis (c) Emphysema (d) Allergy
- (45) The disease in which masses of undifferentiated cells formed in tracheal walls  
 (a) Acute bronchitis (b) Emphysema (c) Lung cancer (d) Pneumonia
- (46) This disease is due to allergens  
 (a) Emphysema (b) Bronchitis (c) Pneumonia (d) Asthma
- (47) During inhalation the following activities occur  
 (a) Area of rib cage increases, diaphragm is pulled upwards  
 (b) Area of rib cage increases, diaphragm is pulled downward  
 (c) Area of rib cage reduces, diaphragm gets contracted  
 (d) Area of rib cage reduces, diaphragm gets relaxed.
- (48) Blood transports oxygen in the form of  
 (a) HHbO<sub>2</sub> (b) KHCO<sub>3</sub> (c) KHbO<sub>2</sub> (d) H<sub>2</sub>CO<sub>3</sub>
- (49) In which three forms of CO<sub>2</sub> is transported by blood  
 (a) As a solution, carbamino compounds, bicarbonates  
 (b) As a solution, carbamino proteins, KHCO<sub>3</sub>  
 (c) As a solution, carbamino haemoglobin, NaHCO<sub>3</sub>  
 (d) As a solution, carbamino compound H<sub>2</sub>CO<sub>3</sub>
- (50) Carbamino proteins are formed in  
 (a) Blood plasma (b) Blood platelets (c) Blood cells (d) RBC
- (51) The centre which excites both the activities during rapid breathing is  
 (a) Ventral respiratory center (b) Lateral respiratory center  
 (c) Pneumotoxic center (d) Dorsal respiratory center.
- (52) The function of pneumotoxic center is  
 (a) To regulate inhalation (b) To maintain rhythmicity of respiration  
 (c) Increases rate of ethalation (d) Does not play significant role.

- (53) During normal breathing the ventral respiratory center  
 (a) Maintain rhythmicity of respiration      (b) Does not play significant role  
 (c) Excites both inhalation and exhalation      (d) Regulate breathing
- (54) AIDS patients are susceptible to this respiratory disease  
 (a) Pneumonia      (b) Fibrosis      (c) Emphysema      (d) Asthma
- (55) The full form of Hb is  
 (a) Hydrogen bromide      (b) Henson bond      (c) Hydrogen bond      (d) Haemoglobin
- (56) H.Hb is  
 (a)  $H_2b$       (b) Heavy hydrogen bond  
 (c) Reduced bromide      (d) Haemoglobin acid
- (57) The enzyme carbonic anhydrase is of which type?  
 (a) Lyases      (b) reversible      (c) Unidirectional      (d) Isomerase.
- (58) What is role of buffer system in blood ?  
 (a) To maintain pH of blood plasma      (b) To maintain pH of blood  
 (c) To maintain pH of RBC      (d) To maintain pH of blood platelets
- (59)  $CO_2$  combines in human RBC with the which ion of haemoglobin  
 (a)  $-NH_2$       (b)  $-OH$       (c)  $-H^+$       (d)  $-COOH$
- (60) On respiratory surface,  $KHCO_3$  formed in RBC reacts with  
 (a)  $H.HbO_2$       (b)  $Cl^-$       (c)  $H.Hb$       (d)  $Hb$
- (61) Where Bicarbonate is converted into carbonic acid  
 (a) In the RBC of capillaries around the lungs  
 (b) In the body fluid  
 (c) In the areolar cavity of lungs  
 (d) In the RBC of blood capillaries around body tissue.
- (62) Maximum amount of  $O_2$  is transported in humans by  
 (a) RBC      (b) WBC      (c) Blood platelets      (d) Blood plasma
- (63) After entering RBC,  $Cl^-$  reacts with.....  
 (a)  $K^+$       (b)  $KHCO_3$       (c)  $H \cdot Hb$       (d)  $KHbO_2$
- (64)  $CO_2$  from RBC enters blood plasma in the form of  
 (a)  $H_2CO_3$       (b)  $HCO_3^-$       (c)  $KHCO_3$       (d)  $NaHCO_3$
- (65) The human ribs  
 (a) Are accessory respiratory organs      (b) Do not help in breathing  
 (c) Are main respiratory organs      (d) Are not respiratory organs
- (66) Respiration rate is the lowest during.  
 (a) Running      (b) Playing      (c) Eating      (d) Sleeping
- (67) Hamburger's phenomenon is also known as (CPMT.1988,1991,AMU.2001,J.LPME.R.2002)  
 (a)  $HCO_3^-$  shift      (b)  $Na^+$  shift      (c)  $H^+$  shift      (d) Chloride shift

- (68) Oxygen carrying capacity of blood is (CPMT.1990)  
 (a) 20% (b) 30% (c) 40% (d) 50%
- (69) Respiratory movements are controlled by (A.P.M.E.E.1978,C.P.M.T.1998)  
 (a) Cerebellum (b) Cerebrum (c) Medulla oblongata (d) Crura cerebri
- (70) At higher CO<sub>2</sub> concentration, oxygen dissociation curve of haemoglobin will (CPMT.1990)  
 (a) Move to left (b) Move to right (c) Become irregular (d) Move upwardly
- (71) Chloride shift is required for transport of (CPMT.1990)  
 (a) Nitrogen (b) Oxygen  
 (c) Carbon dioxide (d) Carbon dioxide and oxygen
- (72) Volume of air inspired or expired with each normal breath is known as (CPMT.1992,AMU.2000)  
 (a) Inspiratory capacity (b) Total Lung capacity  
 (c) Tidal volume (d) Residual volume
- (73) Oxygen haemoglobin dissociation curve will shift to right on decrease of (AMU.1992)  
 (a) Acidity (b) Carbon dioxide concentration  
 (c) Temperature (d) pH
- (74) Is Double membrane pleural sac is situated..... (J.K.C.M.E.E.1992)  
 (a) Envelops the kidneys (b) Envelops the brain  
 (c) Envelops the lungs (d) Lines the nasal passage
- (75) Volume of air remaining in lungs after: maximum respiratory effort is (J.K.C.M.E.E.1992,Har.PMT.2003)  
 (a) Vital capacity (b) Residual volume  
 (c) Total lung capacity (d) Tidal volume
- (76) In expiration, diaphragm becomes (C.P.M.T.1993)  
 (a) Flattened (b) Relaxed  
 (c) Straightened (d) Arched
- (77) Carbon dioxide is transported from tissues to respiratory surface by only (C.B.S.E.1993)  
 (a) Plasma and erythrocytes (b) Plasma  
 (c) Erythrocytes (d) Erythrocytes and leucocytes.
- (78) Respiratory centre is situated in (CPMT.1980,2002,B.H.U.1995,M.P.P.M.T.1998,C.B.S.E.1999,R.PMT.2006)  
 (a) Cerebellum (b) Medulla oblongata  
 (c) Hypothalamus (d) Cerebrum
- (79) Air is breathed through (C.B.S.E.1994.A.P.M.E.E.1999,Karanataka 2002)  
 (a) Trachea → lung → larynx → pharynx → alveoli  
 (b) Nose → larynx → pharynx → alveoli → bronchioles  
 (c) Nostrils → pharynx → larynx → trachea → bronchi → bronchioles → alveoli  
 (d) Nose → mouth → lungs.

- (80) Which is false ? (Manipal 1995)  
 (a) Blood from right side of heart is carried to lungs by pulmonary artery  
 (b) Pleura is double covering of kidney  
 (c) Pancreas is both exocrine & endocrine gland  
 (d) Scurvy is due to vitamin C deficiency.
- (81) Volume of air breathed in and out during effortless respiration is (Kerala 2001)  
 (a) residual volume      (b) vital volume      (c) tidal volume      (d) normal volume
- (82) Body tissue obtain oxygen from haemoglobin due to its dissociation in tissues caused by (M.P.PMT.1995)  
 (a) Low oxygen concentration and high carbon dioxide concentration  
 (b) Low oxygen concentration  
 (c) Low carbon dioxide concentration  
 (d) High carbon dioxide concentration.
- (83) Lungs have a number of alveoli for (M.P.PMT.1995)  
 (a) Having spongy texture and proper shape  
 (b) More surface area for diffusion of gases  
 (c) More space for increasing volume of inspired air  
 (d) More nerve supply.
- (84) Presence of large number of alveoli around alveolar ducts opening into bronchioles in mammalian lungs is (C.B.S.E.1995)  
 (a) Inefficient system of ventilation with little of residual air  
 (b) Inefficient system of ventilation with high percentage of residual air  
 (c) An efficient system of ventilation with no residual air  
 (d) An efficient system of ventilation with little residual air.
- (85) During transport of CO<sub>2</sub> blood does not become acidic due to (C.B.S.E.1995)  
 (a) Neutralisation of H<sub>2</sub>CO<sub>3</sub> by Na<sub>2</sub>CO<sub>3</sub>      (b) Absorption by leucocytes  
 (c) Blood buffers      (d) Non accumulation
- (86) At high altitude, RBCs of human blood will (C.B.S.E.1995, Pb.PMT.1999, J.LPM.E.R.2000)  
 (a) Increase in number      (b) Decrease in number  
 (c) Decrease in size      (d) Increase in size
- (87) CO<sub>2</sub> is transported (C.B.S.E.1095)  
 (a) dissolved in blood plasma      (b) As carbonic acid  
 (c) In carbaminohaemoglobin      (d) As carbaminohaemoglobin and carbonic acid
- (88) Maximum amount 70-75% of carbon dioxide transport occurs as (R.P.M.T.1996,1998, Kamataka 1997, M.P.PMT.1998, C.P.M.T.1998, B.V.2002)  
 (a) Dissolved in plasma      (b) Carbaminohaemoglobin complex  
 (c) Bicarbonate      (d) None of the above

- (89) Trachea is lined with incomplete rings of (D.P.M.T.1996)  
 (a) Fibrous cartilage (b) Calcified cartilage  
 (c) Elastic cartilage (d) Hyaline cartilage
- (90) Oxygen and carbon dioxide are transported in blood through (CB.S.E.1996)  
 (a) Platelets and corpuscles (b) RBCs and WBCs  
 (c) WBCs and serum (d) RBCs and plasma
- (91) About 1500 ml of air left in lungs is called (CB.S.E.1996)  
 (a) Tidal volume (b) Inspiratory reserve volume  
 (c) Residual volume (d) Vital capacity
- (92) Which one protects the lungs? (B.H.U.1990)  
 (a) Ribs (b) Vertebral column (c) Sternum (d) All the above
- (93) Which one has the lowest value?  
 (a) Tidal volume (b) Vital capacity  
 (c) Inspiratory reserve volume (d) Expiratory reserve volume
- (94) A child was killed through asphyxiation. Post mortum confirmed it because a piece of lung put in water (M.P.PMT.1996)  
 (a) Settled down (b) Kept floating  
 (c) Had blood spots (d) None of the above
- (95) Amount of oxygen present in one gram of haemoglobin is (A.I.I.M.S. 1997,Har.PMT,2000)  
 (a) 20 ml (b) 1-34 ml  
 (c) 13-4 ml (d) None of the above
- (96) A molecule of haemoglobin carries how many oxygen molecules ((M.P.P.M.T.1997,Tamil Nadu 2001,C.F.M.T.2002,J.CM.E.E.2004)  
 (a) 1 (b) 2 (c) 3 (d) 4
- (97) In carbon monoxide poisoning there is (A.F.M.C 1997)  
 (a) Increase in carbon dioxide concentration  
 (b) Decrease in oxygen availability  
 (c) Decrease in free haemoglobin  
 (d) None of the above.
- (98) Exchange of gases in lung alveoli occurs through (CB.S.E.1998,A.FMC.2002)  
 (a) Active transport (b) Osmosis  
 (c) Simple diffusion (d) Passive transport
- (99) Haemoglobin is (CB.S.E.1999)  
 (a) Vitamin (b) Skin pigment  
 (c) Blood carrier (d) Respiratory pigment
- (100) Vocal cords occur in  
 (a) Pharynx (b) Larynx (c) Glottis (d) Bronchial tube

- (101) The cells which do not respire (A.F.M.C.2001)  
 (a) Epidermal cells (b) Sieve cells  
 (c) Cortical cells (d) Erythrocytes
- (102) Hiccough (hiccup) is due to activity of (Manipal 2001)  
 (a) Intercostal muscles (b) Food in air tract  
 (c) Diaphragm (d) Inadequate oxygen in environment
- (103) Bicarbonate formed inside erythrocytes moves out to plasma while chloride of plasma pass into erythrocytes. The phenomenon is called (Kerala 2001,2003)  
 (a) Bicarbonate shift (b) Carbonation  
 (c) Hamburger phenomenon (d) None of the above
- (104) Respiratory centre of brain is stimulated by (A.I.I.M.S 2000)  
 (a) Carbon dioxide content in venous blood (b) Carbon dioxide content in arterial blood  
 (c) Oxygen content in venous blood (d) Oxygen content in arterial blood
- (105) A higher CO<sub>2</sub> concentration of blood causes (AM U.2001)  
 (a) Slow diffusion of CO<sub>2</sub> from blood (b) Slow transport of CO<sub>2</sub> from blood  
 (c) Slow diffusion of O<sub>2</sub> from blood (d) Both A and B
- (106) Gases diffuse over the respiratory surface because of (Manipal 2002)  
 (a) O<sub>2</sub> is more in alveoli than in blood (b) O<sub>2</sub> is more in blood than in tissues  
 (c) CO<sub>2</sub> is more in alveoli than in blood (d) PCO<sub>2</sub> is more in blood than in tissues
- (107) Dissociation curve of O<sub>2</sub> (which is dissociation from Hb) shifts to the rights....  
 (a) O<sub>2</sub> concentration decrease (b) CO<sub>2</sub> concentration decreases  
 (c) CO<sub>2</sub> concentration increase (d) Chloride concentration increases
- (108) Thoracic cage of man is formed of (M.P.P.M.T.2002)  
 (a) Ribs and sternum (b) Ribs, sternum and thoracic vertebrae  
 (c) Ribs, sternum and lumbar vertebrae (d) Ribs and thoracic vertebrae.
- (109) Vital capacity of lung is equal to (Karnataka 2002)  
 (a) IRV+ERV+TV (b) IRV+ERV+TV-RV  
 (c) IRV+ERV+TV+RV (d) IRV+ERV
- (110) Dead space is (Manipal 2003)  
 (a) Upper respiratory tract (b) Nasal chambers  
 (c) Alveolar space (d) Lower respiratory tract.
- (111) Carbon monoxide contained in Tobacco smoke (A.I.E.E.E.2003)  
 (a) Is carcinogenic (b) Causes gastric ulcers  
 (c) Reduces oxygen carrying capacity of blood (d) Raises blood pressure
- (112) What is correct ? (Orissa 2003)  
 (a) Pulmonary ventilation is equal to alveolar ventilation  
 (b) Alveolar ventilation is less than pulmonary ventilation  
 (c) Alveolar ventilation is more than pulmonary ventilation  
 (d) Both are variable.

- (113) Increase in CO<sub>2</sub> concentration shall cause (CB.S.E.2004)  
 (a) Slower and shallower breathing  
 (b) Slower and deeper breathing  
 (c) Faster and deeper breathing  
 (d) No effect on breathing
- (114) Alveoli become enlarged and damaged with reduced surface area in heavy smokers. the condition is called (Kerala 2004)  
 (a) Silicosis (b) Emphysema  
 (c) Asthma (d) Bronchitis
- (115) SARS is caused by a variant of (A.I.I.M.S 2004)  
 (a) *Pneumococcus pneumonia*  
 (b) Common cold by Corona virus  
 (c) Asthma  
 (d) Bronchitis
- (116) During inspiration (J.I.PME.R.2004,Orissa 2005,R.PMT.2005)  
 (a) Diaphragm and external muscles relax  
 (b) Diaphragm and internal intercostal muscles relax  
 (c) Diaphragm and external intercostal muscles contract  
 (d) Diaphragm and internal intercostal muscles contract.
- (117) Mountain sickness at high altitude is due to (C.P.M.T.2005)  
 (a) Excess co<sub>2</sub> in blood (b) Decreased CO<sub>2</sub> in air  
 (c) Decreased partial pressure of oxygen (d) Decreased efficiency of haemoglobin
- (118) Capacity of human lungs for air in a healthy person is (Orissa 2005)  
 (a) 3000 ml (b) 1500 ml (c) 1000 ml (d) 500 ml
- (119) Rate of breathing is controlled by  
 (a) Amount of freely available oxygen (b) Carbon dioxide in blood  
 (c) Muscular functions of body (d) All the above
- (120) During strenous exercise,glucose is converted into (B.H.U.2005)  
 (a) Glycogen (b) Pyravic acid (c) Starch (d) Lactic acid
- (121) How much pulmonary air is expired normally (Har.P.M.T.2005)  
 (a) 70% (b) 20% (c) 25% (d) 32%
- (122) Which is incorrect ? (C.B.S.E.2006)  
 (a) Presence of nonrespiratory air sacs increases effcinency of respiration in birds  
 (b) In insects,circulation body fluids serve to distribute oxygen to tissues  
 (c) Principle of counter - current flow facilitates efficient respiration in gills of fishes  
 (d) Residual air in lungs slightly decreases the efficiency of respiration in mammals
- (123) Percenatage of oxygen being carried by blood plasma is (Orissa 2006)  
 (a) 6-9% (b) 3-6% (c) 2-3% (d) 1-2%



(124) Column I represents diseases and column II represents their symptoms. Which of the following pairs are correct match for them (Guj.CE.T.2006)

<b>Column I</b>	<b>Column II</b>
(P) Asthma	(i) Recurring of bronchitis
(Q) Emphysema	(ii) Accumulation of W.B.CS in alveolus
(R) Pneumonia	(iii) Allergy
(a) P = iii, Q = ii, R = i	(b) P = iii, Q = i, R = ii
(c) P = ii, Q = iii, R = i	(d) P = ii, Q = i, R = iii

**125:- Make the correct pairs.**

<b>Column-I</b>	<b>Column-II</b>	
(a) Tidal volume	i. 1000 to 1100 ml	
(b) Residual volume	ii. 500 ml	(a) P - ii, Q - iv, R - i, S - iii
(c) Expiratory reserve volume	iii. 2500 to 3000 ml	(b) P - ii, Q - i, R - iii, S - iv
(d) Inspiratory reserve volume	iv. 1100 to 1200 ml	(c) P - iv, Q - ii, R - iv, S - iii
		(d) P - iv, Q - i, R - iii, S - ii

**126:- Make the correct pairs.**

<b>Column-I</b>	<b>Column-II</b>	
(a) IC	i. Total volume of air inhaled by breathing.	
(b) EC	ii. Volume of air present after expiration in lungs.	(a) P - ii, Q - iii, R - iv, S - i
(c) VC	iii. Volume of air inhaled after expiration.	(b) P - iii, Q - ii, R - iv, S - i
(d) FRC	iv. Volume of air exhaled after inspiration.	(c) P - ii, Q - iv, R - iii, S - i
		(d) P - iii, Q - iv, R - i, S - ii

**127:- Make the correct pairs.**

<b>Column-I</b>	<b>Column-II</b>	
(a) Expiratory capacity	i. VC + RV.	(a) P - i, Q - ii, R - iii, S - iv
(b) Inspiratory	ii. TV + ERV.	(b) P - ii, Q - iii, R - iv, S - i
(c) Vital capacity	iii. TV + IRV.	(c) P - ii, Q - iv, R - i, S - iv
(d) Total lung capacity	iv. TV + IRV + ERV.	(d) P - iii, Q - iv, R - ii, S - i

**128:- Make the correct pairs.**

- | <b>Column-I</b> | <b>Column-II</b>   |                                       |
|-----------------|--|---------------------------------------|
| (a) Silicosis   | i. Spreading of fibrous tissue.                          | (a) P - iii , Q - iv , R - ii , S - i |
| (b) Emphysema   | ii. Little alveolar elasticity.                          | (b) P - iv , Q - iii , R - ii , S - i |
| (c) Asthma      | iii. Muscle of the wall of tracheal branches agitate(d). | (c) P - ii , Q - iii , R - iv , S - i |
| (d) Bronchitis  | iv. Burning sensation of bronchus.                       | (d) P - i , Q - ii , R - iii , S - iv |

**128:- Make the correct pairs.**

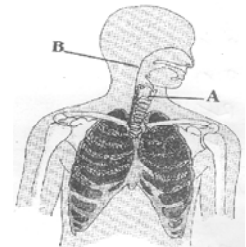
- | <b>Column-I</b> | <b>Column-II</b>                     |                                       |
|-----------------|--------------------------------------|---------------------------------------|
| (a) Pneumonia   | i. Lack of O <sub>2</sub> in organs. | (a) P - iv , Q - iii , R - i , S - ii |
| (b) Bronchitis  | ii. Attack of air and particles.     | (b) P - ii , Q - iii , R - i , S - iv |
| (c) Emphysema   | iii. More coughing.                  | (c) P - iv , Q - i , R - iii , S - ii |
| (d) Asbetosis   | iv. Filling of dead WBC.             | (d) P - ii , Q - iv , R - iii , S - i |

**130:- Make the correct pairs.**

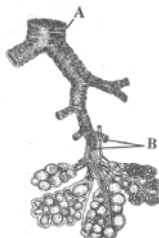
- | <b>Column-I</b> | <b>Column-II</b>                         |                                       |
|-----------------|--|---------------------------------------|
| (a) Bronchus    | i. Give passage to air toward alveoli    | (a) P - ii , Q - iii , R - iv , S - i |
| (b) Alveoli     | ii. Give passage to air toward lung      | (b) P - i , Q - iv , R - ii , S - iii |
| (c) Bronchioles | iii. Give passage to air toward bronchus | (c) P - ii , Q - iv , R - i , S - iii |
| (d) Trachea     | iv. Perform exchange of air              | (d) P - i , Q - iii , R - ii , S - iv |

**131:- What is indicated by A and B respectively in the figure?**

- (a) Trachea and Pharynx
- (b) Larynx and Pharynx
- (c) Nasal chamber and Trachea
- (d) Bronchus and Pharynx



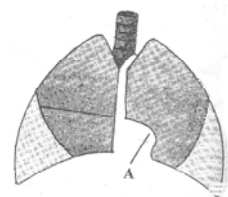
**132:- Where the A and B parys, Labeled in given figure are ended?**



- (a) Bronchus and Lungs
- (b) Bronchioles and Lungs
- (c) Trachea and Bronchioles
- (d) Bronchus and Alveoli

**133:- What is indicated by "A" in figure ?**

- (a) Alveoli
- (b) Lungs
- (c) Heart
- (d) Trachea



**ANSWER KEY**

1. b	2. d	3.c	4.b	5.d
6.d	7.b	8.b	9.b	10.a
11.c	12.b	13.b	14.a	15.b
16.c	17.b	18.a	19.b	20.d
21.d	22.a	23.c	24.d	25.b
26.c	27.b	28.a	29.b	30.b
31.c	32.a	33.b	34.a	35.d
36.c	37.b	38.b	39.d	40.a
41.d	42.d	43.a	44.b	45.c
46.d	47.b	48.c	49.b	50.a
51.a	52.a	53.b	54.a	55.d
56.d	57.b	58.b	59.a	60.a
61.a	62.a	63.a	64.b	65.d
66.d	67.d	68.a	69.c	70.b
71.c	72.c	73.d	74.c	75.b
76.b	77.a	78.b	79.c	80.b
81.c	82.b	83.b	84.d	85.c
86.a	87.d	88.c	89.d	90.d
91.c	92.d	93.a	94.b	95.b
96.d	97.c	98.c	99.d	100.b
101.d	102.c	103.c	104.d	105.c
106.a	107.c	108.b	109.a	110.a
111.c	112.b	113.c	114.b	115.b
116.c	117.c	118.a	119.b	120.d
121.d	122.b	123.c	124.b	125.a
126.b	127.b	128.d	129.a	130.c
131.b	132.c	133.c		



## Unit :-V

### Chapter-21. Body Fluids and Circulation

#### IMPORTANT POINTS

- The cells of every animals need  $O_2$  and nutrients for performing different metabolic activities, and same way end of this process  $CO_2$  and wastes are removed. Hence body fluid is flow throughout the body by blood and lymph.  
Blood as a fluid connective tissue made of body corpuscles.
- In the composition of blood plasma, water, salts and proteins are included. It covers 55 % of blood. RBC, WBC and platelets are included in blood corpuscles. It covers 45 % of blood.
- In human ABO and Rh blood groups are found. In which A, B, AB and O blood groups are included in ABO, while  $Rh^{+ve}$  and  $Rh^{-ve}$  included in Rh group.
- The major chemical defense against blood loss is the formation of blood clot. In it 13 factors are included. This process involves three phases
  - (i) Formation of thromboplastin
  - (ii) Formation of thrombin
  - (iii) Formation of fibrin
- The composition of lymph is similar to blood plasma. It flows in body through lymphatic vessels.
- Human having close circulation. In it blood vessels (artery, vein and capillaries) and heart are included.
- Human heart having four chambers, in which two auricles and two ventricles are included. Many valves are seen in the structure of heart. It regulates the direction of blood flow.
- Blood with  $O_2$  and without  $O_2$  flow separately in human, for that it is called double circulation.
- Hypertension, atherosclerosis and arteriosclerosis like diseases occurred due to abnormality in blood circulation.

- (1) Mammalian heart is
 

(a) Neurogenic	(b) Myogenic	(c) Digenic	(d) None of above
----------------	--------------	-------------	-------------------
- (2) Granulocytes are
 

(a) Acidophils	(b) Lymphocytes	(c) Monocytes	(d) None of these
----------------	-----------------	---------------	-------------------
- (3) The largest corpuscle in the blood is
 

(a) Basophils	(b) Acidophils	(c) Monocytes	(d) Lymphocyte
---------------	----------------	---------------	----------------

- (4) Thrombokinase is produced in  
 (a) RBC                      (b) WBC                      (c) Blood vessels      (d) blood platelets
- (5) The chief difference between the erythrocytes of man and frog is  
 (a) Human erythrocytes have more haemoglobin  
 (b) Human erythrocytes have less haemoglobin  
 (c) Human erythrocytes have no nuclei  
 (d) Human erythrocytes have more nuclei
- (6) In mammals the opening of post canal in the right auricle is guarded by  
 (a) Mitral valve                      (b) Thebesius valve  
 (c) Eustachian valve                      (d) tricuspid valve
- (7) The volume of blood present in an adult human is  
 (a) 1 liter                      (b) 5 liters      (c) 2 liters                      (d) 10 liters
- (8) The instrument used for measuring blood pressure is known as  
 (a) ECG                      (b) Stethoscope  
 (c) Sphygmomanometer                      (d) EEG
- (9) The heart murmur of heart is due to  
 (a) Coronary thrombosis                      (b) Defective leady valve  
 (c) Arterial pulse                      (d) under developed atrium
- (10) Thromboplastin is produced by  
 (a) Damaged tissues                      (b) Blood platelets  
 (c) Both (a) and (b)                      (d) Prothrombin
- (11) The thin membrane around the heart is  
 (a) Myocardium      (b) Pericardium  
 (c) Pleural membrane (d) Parietal peritoneum
- (12) Three important proteins present in blood are  
 (a) Collagen, albumin, fibrinogen                      (b) Albumin, globulin, Actin  
 (c) Globulin, albumin, collagen                      (d) Albumin, globulin, fibrinogen
- (13) QRS wave in ECG represents  
 (a) Auricular systole                      (b) ventricular systole  
 (c) ventricular diastole                      (d) End of ventricular systole
- (14) Which protein helps in disease resistance ?  
 (a) Albumin                      (b) Fibrinogen  
 (c) globulin                      (d) both (a) and (b)
- (15) Play an important role in allergic reaction by  
 (a) Neutrophils                      (b) Lymphocytes      (c) Basophils                      (d) Monocytes

- (16) 'Intrinsic factor - x Activator complex ' is  
 (a) Activated factor IX + AHG + Phospholipid +  $Mg^{2+}$   
 (b) Christmas factor IX + AHG + Phospholipid +  $Mg^{2+}$   
 (c) Activated christmas factor + AHG + Phospholipid +  $Ca^{2+}$   
 (d) Activated christmas factor + AHG + Glycolipid +  $Mg^{2+}$
- (17) It converts fibrinogen into soluble fibrin  
 (a) Thromboplastin    (b) Thrombin    (c) Prothrombin    (d)  $Ca^{2+}$
- (18) Which factor is delaying in blood clotting  
 (a) Vit K    (b) Hirudin    (c) Heparin    (d) All of above
- (19) In pericardium double walled structure - outer layer and inner layer are respectively  
 (a) Serosa layer and fibrous layer    (b) Fibrosa layer and serous layer  
 (c) Fibrous layer and Muscular layer    (d) Muscular layer and fibrous layer
- (20) Tricuspid valve is situated in between  
 (a) Left auricle and left ventricle    (b) Right auricle and left ventricle  
 (c) Inter atrial septum    (d) Inter ventricular septum
- (21) Blood is flowing in pulmonary vein is  
 (a) Oxygenated    (b) Deoxygenated    (c) Mixed    (d) None of above
- (22) Diastole of ventricles is  
 (a) 0.30 sec    (b) 0.40 sec    (c) 0.70 sec    (d) 0.10 sec
- (23) The wave representing of ventricles diastole is  
 (a) P    (b) Q    (c) R    (d) T
- (24) Heart is known as double pump (circulation) because of  
 (a) the right chamber push blood into lungs  
 (b) left chambers push blood into the entire body  
 (c) Heart receives impure blood from the body  
 (d) both (a) and (b)
- (25) Effect of Nicotine on blood circulation  
 (a) it mixes with blood  
 (b) it contracts the arterial wall  
 (c) it decrease the blood pressure  
 (d) it decrease the carrying of oxygen to lungs
- (26) It decreasing the carrying of oxygen of Haemoglobin  
 (a) Oxygen    (b) Carbon dioxide    (c) Carbon monoxide    (d) Nitrogen
- (27) Number of leucocytes is 1 cubic mm  
 (a) 5000 - 8000    (b) 2000 - 3000  
 (c) 8000 - 13000    (d) 1 - 5 million

- (28) It shows pulmonary circulation :
- (a) Left atrium (Oxygenated blood) - Lungs (deoxygenated blood ) - Right atrium
  - (b) Left atrium (deoxygenated blood ) - Lungs (oxygenated blood ) - Right atrium
  - (c) Left atrium (Oxygenated blood )- Lungs (deoxygenated blood )- Left atrium
  - (d) Right atrium (deoxygenated blood) - Lungs (oxygenated blood) - Left atrium
- (29) Systolic pressure of heart
- (a) 80 mm Hg            (b) 120 mm Hg            (c) 40 mm Hg            (d) 320 mm Hg
- (30) SA - Node is located at
- (a) Left upper corner of the left atrium
  - (b) Left lower corner of the left atrium
  - (c) Right upper corner of the right atrium
  - (d) Right lower corner of the right atrium
- (31) Pathway of myogenic impulse conduction is
- (a) SAN - AVN - Bundle of His - Purkinje fibers
  - (b) SAN - AVN - Purkinje fibers - Bundle of His
  - (c) AVN - SAN - Bundle of His - Purkinje fibers
  - (d) AVN - Bundle of His - SAN - Purkinje fibers
- (32) In disease erythroblastosis foetalis
- (a) Destroy the baby's WBCs            (b) A baby suffering from atherosclerosis
  - (c) Destroy the baby's RBCs            (d) An increasing in the number of RBCs
- (33) A person having both antigen A and antigen B on the surface of RBCs :
- (a) That person do not possess antibody in serum
  - (b) He can donate the blood to only having AB blood group
  - (c) He is universal recipient
  - (d) All the above
- (34) responsible factor XI of blood clotting is
- (a) Antiheamophilic globulin            (b) Plasma thromboplasin antecedent
  - (c) Fibrin stabilizing            (d) Hageman factor
- (35) It is an important method for checking the health related problems of the heart.
- (a) Xray            (b) ECG            (c) ELISA            (d) CBC
- (36) Blood group is due to
- (a) Specific antigen on the surface of WBC
  - (b) Specific antibodies on the surface of RBC
  - (c) Specific antigen of the surface of RBC
  - (d) Type of haemoglobin in blood

- (37) Leucopenia is the condition where  
 (a) Leucocytes decrease below 5000 per cubic mm of blood (b) Bone marrow is destroyed  
 (c) Total number of lymphocytes decrease from 2 % to 5 %  
 (d) Leucocytes increase above 6000 per cubic mm
- (38) Carbonic anhydrase enzyme present in  
 (a) WBC (b) RBC (c) Blood plasma (d) Platelets
- (39) The coagulation of blood occurs due to  
 (a) Destruction of RBC (b) Destruction of WBC  
 (c) Destruction of lymph (d) Destruction of blood platelets
- (40) The valve present at the left auriculo - ventricular aperture is  
 (a) Tricuspid valve (b) Semilunar valve  
 (c) Mitral valve (d) Eustrachian valve
- (41) Heart beat is  
 (a) Induced by hormones  
 (b) Voluntary process  
 (c) Dependent upon the stimulation by nerve complex  
 (d) Auto inducing
- (42) At the time of auriculo ventricular valve shut, the sound is  
 (a) Lubb (b) Dubb (c) Lubb - dubb (d) Dhak - Dhak
- (43) The systole is  
 (a) The relaxation of auricles (b) The relaxation of ventricles  
 (c) Relaxation of chambers of heart (d) Contraction of heart chambers
- (44) Blood plasma is  
 (a) Acidic (b) Basic (c) Neutral (d) Variable
- (45) A clot of blood contains  
 (a) Fibrinogen (b) Prothrombin (c) Thrombin (d) Fibrin
- (46) Which one of the common anticoagulant is used for preserving blood ?  
 (a) Sodium hydroxide (b) Sodium chloride  
 (c) Sodium oxalate (d) Sodium bicarbonate
- (47) Arteries carry oxygenated blood except  
 (a) Pulmonary (b) Cardiac (c) Hepatic (d) Systemic
- (48) Increase in number of leucocytes beyond normal indicates  
 (a) Anemia  
 (b) Infection  
 (c) Increased defense against pathogen  
 (d) Non formation of RBC



- (49) Largest number of white blood corpuscles are  
 (a) Eosinophils      (b) Basophils      (c) Neutrophils      (d) Monocytes
- (50) Blood is red but RBC are absent in  
 (a) Frog      (b) Man      (c) Rabbit      (d) Earthworm
- (51) Pace maker is  
 (a) Instrument for measuring heart beat  
 (b) Instrument for measuring pulse rate  
 (c) Auriculo - ventricular node that provides impulse for heart beat  
 (d) Sino - auricular node that provides impulse for heartbeat
- (52) Which has the thickest walls ?  
 (a) Left ventricle      (b) Right ventricle  
 (c) Left auricle      (d) Right auricle
- (53) Prothrombin required for blood clotting is produced in  
 (a) Stomach      (b) Liver      (c) Spleen      (d) Pancreas
- (54) Contraction of right ventricle pumps blood into  
 (a) Dorsal aorta      (b) Pulmonary artery      (c) Pulmonary vein      (d) Coronary artery
- (55) Dub sound is produced during closure of  
 (a) Semilunar valves      (b) Bicuspid valve      (c) Tricuspid valve      (d) Both a & b
- (56) In circulatory system, valves occur in  
 (a) Heart and blood vessels of both vertebrates and invertebrates  
 (b) Both vertebrate and invertebrate hearts  
 (c) Vertebrate heart only  
 (d) Invertebrate heart only
- (57) In blood  
 (a) WBCs are more than RBCs      (b) RBCs are more than WBCs  
 (c) RBCs are less than platelets      (d) Platelets are less than WBCs
- (58) Pericardial fluid is secreted by  
 (a) Myocardium      (b) Parietal peritoneum  
 (c) Visceral peritoneum      (d) None of the above
- (59) Pulse pressure is  
 (a) Diastolic pressure      (b) Systolic pressure  
 (c) Difference between b and a      (d) Pressure in great veins
- (60) Which one are granulocytes  
 (a) Neutrophils, basophils, lymphocytes      (b) Eosinophils, basophils, monocytes  
 (c) Basophils, monocytes, lymphocytes      (d) Neutrophils, eosinophils, basophils

- (61) Lymph consists of  
 (a) RBCs, WBCs and plasma  
 (b) RBCs, proteins and platelets  
 (c) All components of blood except RBCs and some proteins  
 (d) WBCs and serum
- (62) Find the matching pair :  
 (a) Lubb- sharp closure of AV valves at beginning of ventricular systole  
 (b) Dub - sudden opening of semilunar valves at the beginning of ventricular systole  
 (c) Pulsation of radial artery valves in blood vessels  
 (d) Initiation of heart beat - Purkinje fibers
- (63) Valves which allow blood from ventricles into arteries and not in opposite direction are  
 (a) Aortic valve and mitral valve                      (b) AV valves and semilunar valves  
 (c) Bicuspid and tricuspid valves                      (d) Semilunar valves and tricuspid valve
- (64) Bundle of His is a network of  
 (a) Muscle fibres distributed throughout heart walls  
 (b) Muscle fibres found only in ventricle wall  
 (c) Nerve fibres distributed in ventricles  
 (d) Nerve fibres found throughout the heart
- (65) Artificial pacemaker is usually implanted to correct the defect in  
 (a) AV node                      (b) SA node                      (c) Purkinje fibers                      (d) Mitral valve
- (66) Pulmonary vein carries oxygenated blood from  
 (a) Heart to its walls                      (b) Heart to lungs  
 (c) Lungs to heart                      (d) Heart to all body parts
- (67) The sequence of cardiac cycle is  
 (a) Atrial systole - ventricular systole - joint diastole  
 (b) Atrial diastole - Atrial systole - ventricular diastole  
 (c) Atrial systole - ventricular diastole - ventricular systole  
 (d) ventricular diastole - ventricular systole - Atrial systole
- (68) The blood returning to the heart from lungs via pulmonary vein has more  
 (a) RBC per ml of blood (b) Haemoglobin per ml of blood  
 (c) Oxygen per ml of blood (d) Nutrient per ml of blood
- (69) Systemic heart refers to  
 (a) The two ventricles together in humans  
 (b) The heart that contracts under stimulation from nervous system  
 (c) Left auricle and left ventricle in higher vertebrates  
 (d) Entire heart in lower vertebrates

- (70) In the heart of mammals the bicuspid valve is situated between  
 (a) Left auricle and left ventricle (b) Post caval and right caval  
 (c) Right auricle and left auricle (d) Right ventricle and pulmonary aorta
- (71) The auriculo ventricular node in human heart was discovered by  
 (a) Hiss (b) Lewis (c) Ringer (d) William Harvey
- (72) The beating of heart of man is heard on the left side because  
 (a) The left ventricle is toward the left side  
 (b) Both the ventricles are towards the left side  
 (c) Entire heart is on the left side  
 (d) The aorta is on the left side
- (73) Purkinje's fibres are special types of  
 (a) Muscle fibres located in heart  
 (b) Nerve fibres located in cerebrum  
 (c) Connective tissue fibers joining one bone to another bone  
 (d) Sensory fibers extending from retina into optic nerve
- (74) The pericardium and the pericardial fluid help in  
 (a) Protecting the heart from friction, shocks and keeps it moist  
 (b) Pumping the blood  
 (c) Receiving the blood from various parts of the body  
 (d) None of the above
- (75) For reaching left side of heart, blood must pass through  
 (a) Liver (b) Kidneys (c) Lungs (d) Brain
- (76) The posterior venacava  
 (a) Divides into the hepatic portal veins (b) Opens into the left auricle  
 (c) Commences at the kidney (d) Begins at the hind end of abdomen
- (77) Open circulatory system is present in  
 (p) Arthropods (q) Annelids  
 (R) Chordates (S) Molluscs (except cephalopods)  
 (a) P (b) P & Q (c) P & S (d) S & R
- (78) 'Heart of heart' is  
 (a) SA - Node (b) AV - Node (c) Bundle of His (d) Purkinje fibres
- (79) An oval depression called fossa ovalis is seen on  
 (a) Inter atrial septum (b) Inter ventricular septum  
 (c) Right auriculo - ventricular septum (d) Left auriculo - ventricular septum

- (80) Which of the following statements is related to Starling's law of heart
- (a) Greater the stroke volume greater is the heart rate
  - (b) Greater the initial length of the cardiac muscle fibre, more the force of contraction of heart
  - (c) Greater the minute volume, greater is the heart rate
  - (d) Lesser the length of cardiac muscle fibre greater is the force of contraction of heart
- (81) An artificial pace - maker is implanted subcutaneously and connected to the heart in patients
- (a) Having 90 % blockage of the three main coronary arteries
  - (b) Having a very high blood pressure
  - (c) With irregularity in the heart rhythm
  - (d) Suffering from arteriosclerosis
- (82) The pace - setter in the heart is called
- (a) Purkinje fibres
  - (b) SA - Node
  - (c) Papillary muscle
  - (d) AV - Node
- (83) Cardiac output is determined by
- (a) Heart rate
  - (b) Stroke volume
  - (c) Blood flow
  - (d) Both a & b
- (84) Which of the following blood vessels has wide lumen
- (a) Renal vein
  - (b) Post venacava
  - (c) Renal artery
  - (d) Right pulmonary artery
- (85) In haemodialysis, patient's blood is pumped from one of the arteries and mixing with X. Blood is purified and it is then pumped into vein of the patient after adding Y to it.
- |                            |                           |                           |                          |
|----------------------------|---------------------------|---------------------------|--------------------------|
| X                          | Y                         | X                         | Y                        |
| (a) Heparin , Anti heparin | (b) Prothrombin, Thrombin | (c) antiheparin , Heparin | (d) Prothrombin, Heparin |
- (86) Wave 'T' is representing in ECG as :
- (a) Diastole of both atria and ventricles
  - (b) Systole of right atria and left ventricle
  - (c) Systole of the left atria and right ventricle
  - (d) Systole of both atria and ventricles
- (87) Which one of the following vein breaks up into capillaries
- (a) Renal vein
  - (b) Hepatic vein
  - (c) Pelvic vein
  - (d) Pulmonary vein
- (88) Serotonin in the blood
- (a) Relaxes blood vessels
  - (b) Prevents clotting of the blood
  - (c) Helps in clotting of blood
  - (d) Constricts blood vessels
- (89) The artery can be distinguished from the vein in having
- (a) Thicker walls
  - (b) More blood cells
  - (c) More plasma
  - (d) Larger cavity

- (90) The pulse beat is measured by the  
 (a) Artery (b) Capillary (c) Vein (d) None
- (91) Carotid artery carries  
 (a) Impure blood from brain  
 (b) Oxygenated blood to anterior region of body or to brain  
 (c) Impure blood to kidney  
 (d) Oxygenated blood to heart
- (92) Blood vessels carrying blood from lungs to heart  
 (a) Pulmonary artery (b) Pulmonary vein (c) Carotid artery (d) Coronary artery
- (93) The diaphragm is supplied blood by  
 (a) Cardiac artery (b) Phrenic artery (c) Lingual artery (d) Lumber artery
- (94) Iliac artery carries blood to the  
 (a) Lungs (b) Ileum (c) Hind limb (d) Brain
- (95) The structure of which of the following consist of a layer of single cell thickness  
 (a) Blood capillary (b) Artery (c) Venule (d) Arteriole
- (96) Make correct pairs.

**Column I**

P. Basophils

Q. Lymphocytes

R. Neutrophils

S. Acidophils

**Column II**

T. 1 To 40 %

U. 40 to 70 %

V. 20 to 45 %

W. 0 to 1 %

**Column III**

i. Kill micro organism

ii. Active phaagoacytes

iii. Allergens]

iv. Immunity

(a) (P-W-ii), (Q-V-iv), (R-U-ii),(S-T-i)

(b) (P-T-ii),(Q-U-iv),(R-V-iii), (S-W-i)

(c) (P-W-ii),(Q-V-iii),(R-T-i),(S-U-iv)

(d) (P-V-i),(Q-U-iii),(R-W-iv),(S-T-ii)

- (97) Make correct pairs :

**Column I**

P. water

Q. Fibrogen

R. Albumin

S. Globulin

**Column II**

i. Immunity

ii. Solvent of substance

iii. Blood clotting

iv. Regulation of osmosis

P Q R S

(a) ii iii iv

(c) ii iii i

P Q R S

(b) i iv iii ii

(d) iii ii iv i

(98) Make the correct pairs.

<b>Column I</b>		<b>Column II</b>	
Factor		Identity	
P. IX		i. Proaccelerin	
Q. XII		ii. Fibrinogen	
R. V		iii. Christmas factor	
S. I		iv. Hageman factor	

P	Q	R	S		P	Q	R	S	
(a)	iv	ii	i	iii	(b)	iii	i	ii	iv
(c)	ii	iv	iii	i	(d)	iii	iv	i	ii

(99) Make the correct pairs.

<b>Column I</b>				<b>Column II</b>			
P. Tricuspid valve				i. Right ventricle - pulmonary trunk			
Q. Mitral valve				ii. Left ventricle - aorta			
R. atrial - semilunar valve				iii. Right atrium - right ventricle			
S. pulmonary - semilunar valve				iv. Left atrium - left ventricle			

	P	Q	R	S		P	Q	R	S
(a)	iii	iv	i	ii	(b)	iv	iii	i	ii
(c)	iii	iv	ii	i	(d)	iv	iii	ii	i

(100) Make the correct pairs.

<b>Column I Time</b>				<b>Column II PROCESS</b>			
P. 0.40 Sec				i. Blood of atrium flows in to ventricle			
Q. 0.10 Sec				ii. Blood of ventricle flows into truncus arteriosus			
R. 0.30 Sec				iii. Phase of atrium and ventricle systole			
S. 0.80 Sec				iv. Total time of one cardiac cycle			

	P	Q	R	S		P	Q	R	S
(a)	iii	i	iv	ii	(b)	iii	i	ii	iv
(c)	iii	ii	i	iv	(d)	i	iii	ii	iv

**MORE THAN ONE TRUE OR FALSE STATEMENTS TYPE QUESTION**

**(TRUE = T; FALSE = F)**

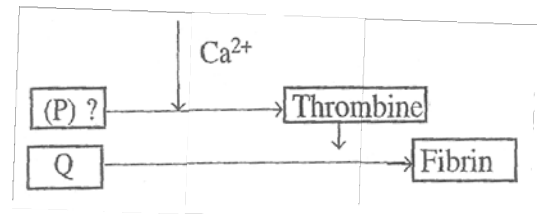
(101) According to statements find the correct option :

1. The composition of lymph is very much like that of the blood.
2. Lymph is responsible for immunity.
3. Lymphocytes added when lymph passes through small capillaries
4. Lymph is contain less fibrinogen than blood plasma

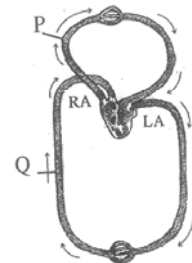
- (a) FTFT                      (b) TTFT                      (c) TTTT                      (d) TTTF
- (102) According to statements find the correct option :
1. Blood connects every cells, tissue and organs of body.
  2. Blood is known as connective tissue proper.
  3. Blood plasma constituted about 45 % of blood.
  4. Blood is light yellow coloured and slightly viscous extra cellular fluid.
- (a) FTFT                      (b) TTTT                      (c) TFFT                      (d) TTFF

- (103) According to statements find the correct option :
1. Stuart factors are activated by : IX, VIII, IV and Phospholipid
  2. Intitiated factors of this system are derived from the blood plasma
  3. In intrinsic pathway blood clotting stats
  4. PTA is activated by XIIa
- (a) FTTF                      (b) TFFT                      (c) FTTF                      (d) TTTT

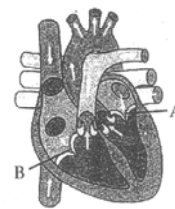
- (104) What P and Q indicate in the given figure ?
- (a) Thromboplast, Proaccelerin
  - (b) Prothrombin, Fibrinogen
  - (c) Globulin, FSF
  - (d) Plasma thromboplastin, Fibrin stabilizing



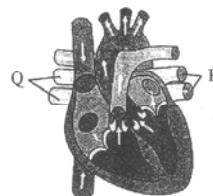
- (105) What P and Q indicate in the given figure ?
- (a) Pulmonary artery, pulmonary vein
  - (b) Anterior vena cava, Dorsal aorta
  - (c) Pulmonary artery, Vena cava
  - (d) Pulmonary vein, Dorsal aorta



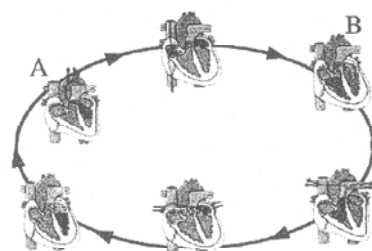
- (106) Mention the name of A and B in the given figure :
- (a) Right ventricle, Left ventricle
  - (b) Aorta valve, Right atrium
  - (c) Bicuspid valve, Tricuspid valve
  - (d) Left atrium, Right ventricle



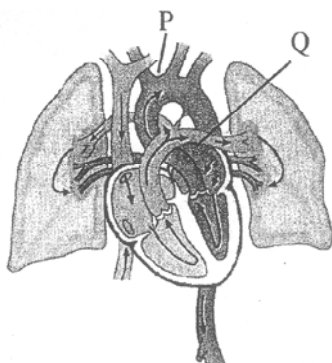
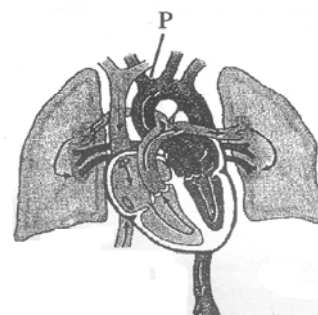
- (107) Which type of blood flows in P and Q indicating parts ?
- (a) Oxygenated in both
  - (b) Deoxygenated in both
  - (c) Oxygenated, Deoxygenated
  - (d) Deoxygenated, Oxygenated



- (108) A and B in the figure indicate which state ?  
 (a) Ventricle systole, Atrium systole  
 (b) Ventricle diastole, Atrium diastole  
 (c) Filling of blood in ventricle, Atrium systole  
 (d) Ventricle systole, Blood flow out



- (109) Mention the name of P in the given figure :  
 (a) Deoxygenated blood enters into lungs  
 (b) Oxygenated blood flows outside the lungs  
 (c) Oxygenated blood flows toward the body  
 (d) Deoxygenated blood flows from the body
- (110) Mention the name of P in the given figure.



- (a) Deoxygenated blood flows from the body  
 (b) Oxygenated blood flows from the lungs  
 (c) Oxygenated blood flows toward the body  
 (d) Deoxygenated blood enters into lungs
- (111) What is the life span of RBC in humans ? (AFMC - 90)  
 (a) 120 days                      (b) 210 days  
 (c) 220 days                      (d) 200 days
- (112) What is found in the surrounding of wall of heart ? (AFMC - 93)  
 (a) Pericardial cavity (b) Perineural cavity  
 (c) Pericardium                      (d) None of the above
- (113) By which cause Dubb sound arises ? (CBSC-94)  
 (a) Closing of semilunar valve                      (b) Closing of bicuspid valve  
 (c) Closing of tricuspid valve                      (d) Both b and c
- (114) Which is the pacemaker heart ? (CBSC - 94)  
 (a) AV Node                      (b) SA Node                      (c) Purkinje fiber                      (d) Bundle of His muscle



- (115) Where granular WBCs are produced ? (DPMT-95)  
 (a) Kidney (b) Liver (c) Small intestine (d) Bone marrow
- (116) Which type of WBCs are found in maximum number ?  
 (a) Monocytes (b) Basophils (c) Acidophils (d) Neutrophils
- (117) Which of the following is not useful in blood clotting. (AFMC-96)  
 (a) Fibrin (b) Calcium (c) Platelets (d) Bilirubin
- (118) In which of the following close circulation is found ? (CBSC-94)  
 (a) Cockroach (b) Mosquito (c) Housefly (d) Tadpole
- (119) The wall of which part of the heart is very thick ? (AiiMS-99)  
 (a) Left atrium (b) Left ventricle (c) Right atrium (d) Right ventricle
- (120) What is right for all veins ? (CBSC-2000)  
 (a) They carry oxygenated blood (b) They carry Deoxygenated blood  
 (c) They directly open into vena cave (d) None of the above
- (121) How lymph differs from blood ? (CPMT - 73,84)  
 (a) More RBC and less WBC (b) Less RBC and more WBC  
 (c) RBC absent and less RBC (d) RBC absent and more WBC
- (122) Which type of WBCs are found in maximum number ? (CPMT-88, DPMT -96)  
 (a) Eosiphil (b) Nutrophil (c) Acidophil (d) Monocyte
- (123) What is pacemaker ?  
 (a) Instrument measuring Heartbeats  
 (b) Instrument measuring big arteries  
 (c) Atrio - ventricular node, which provides stimulation for heart beating  
 (d) Artificial syno - auricular node, which provides stimulation for heart beating
- (124) Which of the following statement is correct ? (BHU-93)  
 (a) All veins carry deoxygenated blood  
 (b) All arteries carry deoxygenated blood  
 (c) All veins carry deoxygenated blood except one  
 (d) All arteries carry deoxygenated blood except one
- (125) Regulation and initiation of heartbeat is indicated by (karnataka - 94, CBSE- 95)  
 (a) AV Node - bundle of His muscle - SA node - purkinje fiber  
 (b) SA Node - purkinje fiber - AV Node - Bundle of His muscle  
 (c) Purkinje fiber - AV Node - SA node - Bundle of His muscle  
 (d) SA Node - AV Node - Bundle of His muscle - Purkinje fiber

- (126) Where Mitral valve is located and it join, so by which ?  
(BHU-86, 2000, DPMT-86,MANIPAL-95)
- (a) Left atrium and left ventricle      (b) Left atrium and Right ventricle  
(c) Right atrium and Left ventricle      (d) Right atrium and Right ventricle
- (127) What is responsible for systole ?      (BHU-86,2000,DPMT-86,MANIPAL-95)
- (a) Entry of blood in lungs      (b) Entry of blood in heart  
(c) Blood flow out of heart      (d) Blood flow out of vein
- (128) What is the function of lymph ?      (MPPMT-95)
- (a) Transport of O<sub>2</sub> into brain (b) Transport of CO<sub>2</sub> into lungs  
(c) Bring interstitial fluid in blood (d) Bring RBC and WBC in lymph node
- (129) Which is the correct statement for blood ?      (APMEE - 96)
- (a) WBC is more than RBC      (b) RBC is more than WBC  
(c) RBC is less than platelets      (d) Platelets is less than RBC
- (130) Hepatic portal system starts from
- (a) Digestive system to liver      (b) Kidney to liver  
(c) Liver to heart      (d) Liver to Kidney
- (131) Blood circulation that starts in capillaries and ends in capillaries is called (J & K CET 2010)
- (a) Portal circulation      (b) Hepatic circulation  
(c) Cardiac circulation      (d) None of these
- (132) Which of the following carries glucose from digestive tract to liver  
(CBSE PMT-1999,BHU 2001)
- (a) Hepatic artery      (b) Hepatic portal vein  
(c) Pulmonary vein      (d) None of these
- (133) Lymph (nodes) glands form
- (a) Hormones      (b) Lymphs      (c) Antigens      (d) Antibodies
- (134) Which of the following is not a major organ of lymphatic system (MP PMT 2010)
- (a) Lymph nodes      (b) Thymus      (c) Kidney      (d) Spleen
- (135) Lymph is colourless because      (MP PMT 1999)
- (a) WBC are absent (b) WBC are present (c) Hemoglobin is absent (d) RBC are absent
- (136) Immunoglobulins are produced by      (CBSE 1996)
- (a) Lymphocytes      (b) Spleen      (c) Leucocytes      (d) Monocytes
- (137) Which one of the following human organs is often called the "graveyard"?  
(AIPMT 2012-M)
- (a) Albumin      (b) Serum amylase      (c) Globulin      (d) Fibrinogen

- (138) Which of the following human organs is often called the “graveyard” of RBC ?  
(AIPMT 2012-M)  
(a) Spleen                      (b) kidney                      (c) Pancreas                      (d) Liver
- (139) There is no DNA in  
(a) Mature RBCs                      (b) Mature spermatozoa  
(c) Hair root                      (d) Ovum
- (140) In the ABO system of blood groups, if both antigens are present but no antibody, the blood group of the individual would be ?  
(AIPMT 2011)  
(a) B                      (b) O                      (c) AB                      (d) A
- (141) Make correct pairs :
- | <b>Column - I</b>      | <b>Column - II</b>   |
|------------------------|--|
| P. Anterior vena cava  | (i) Transport deoxygenated blood into lungs                                |
| Q. Posterior vena cava | (ii) Transport the oxygenated blood outside the lungs                      |
| R. Pulmonary Artery    | (iii) Bring deoxygenated blood from lower part of the body to right atrium |
| S. Pulmonary vein      | (iv) Bring deoxygenated blood from upper part of the body to right atrium  |
- (a) P-ii, Q-iv, R-iii, S-i  
(b) P-iv, Q-i, R-ii, S-iii  
(c) P-iv, Q-iii, R-ii, S-i  
(d) P-iii, Q-iv, R-ii, S-i
- (142) Which of the following is correct for all veins ?  
(a) All veins transport deoxygenated blood  
(b) All veins transport oxygenated blood  
(c) They transport blood from organs to heart  
(d) They transport blood from heart to organs
- (143) What is diastolic pressure is ?  
(a) 120 mmHg                      (b) 80mmHg                      (c) 120/80mmHg                      (d) 40mmHg
- (144) Which of the following are granular WBCs ?                      (Manipal - 2002)  
(a) Neutrophils, Basophils, Lymphocytes                      (b) Eosinophil, Basophil, Monocytes  
(c) Basophils, Monocytes, Lymphocytes                      (d) Neutrophils, Eosinophils, Basophils
- (145) What P indicates in ECG ? (Wardha - 2003)  
(a) End of atrium systole                      (b) Starting of atrium systole  
(c) End of ventricle systole                      (d) Starting of ventricle systole

### ASSERTION TYPES QUESTIONS

#### ASSERTION (A) AND REASON (R) TYPES QUESTIONS

- (a) Both A and R are true and R is correct explanation of A  
 (b) Both A and R are true but R is not correct explanation of A  
 (c) A is true but R is not true  
 (d) A is not true but R is true
- (146) A : First heart sound is 'dubb' while second heart sound is 'lubb'  
 R : 'Lub' is due to closing of auriculoventricular valves, while 'Dub' is due to closing of semilunarvalves  
 (a) (b) (c) (d)
- (147) A : All the arteries of human have oxygenated blood.  
 R : In human left parts of heart is caring oxygenated blood.  
 (a) (b) (c) (d)
- (148) A : In body oxygenated and deoxygenated blood transported in different vessels.  
 R : Atria and ventricles are separated by AV valves.  
 (a) (b) (c) (d)
- (149) A : In normal condition the cardiac cycle occurs about 72 times per minute  
 R : Each cardiac cycle takes about 0.8 second.  
 (a) (b) (c) (d)
- (150) A : ECG is an important method for checking the health or health related problems of the heart  
 R : Function of valves is checked by ECG :  
 (a) (b) (c) (d)
- (151) A : SAN initiates the heart beat  
 R : Sympathetic nerve fibres increase the cardiac activity.  
 (a) (b) (c) (d)
- (152) A : In healthy arteries, the innermost layer of the wall is smooth.  
 R : In healthy person diastolic pressure is 120 mm Hg  
 (a) (b) (c) (d)
- (153) A : Atherosclerosis is known as hardening of arteries  
 R : The arterial walls become thick and inelastic due to deposition of cholesterol and calcium salts  
 (a) (b) (c) (d)
- (154) A : In normal condition cardiac output of healthy person is 5000ml/min.  
 R : In normal condition volume stroke is 70 ml.  
 (a) (b) (c) (d)
- (155) A : Clotting of blood is characteristic of human blood  
 R : Each erythrocytes possess Hb.  
 (a) (b) (c) (d)

**Answers**

(1) b	(35) b	(69) c	(103) d	(137) d
(2) a	(36) b	(70) b	(104) b	(138) a
(3) c	(37) a	(71) b	(105) c	(139) a
(4) d	(38) b	(72) d	(106) c	(140) c
(5) c	(39) d	(73) a	(107) a	(141) c
(6) c	(40) b	(74) a	(108) c	(142) c
(7) b	(41) d	(75) c	(109) c	(143) b
(8) c	(42) a	(76) d	(110) c	(144) d
(9) b	(43) c	(77) c	(111) a	(145) b
(10) c	(44) b	(78) a	(112) c	(146) d
(11) b	(45) d	(79) a	(113) a	(147) d
(12) d	(46) c	(80) b	(114) b	(148) a
(13) b	(47) a	(81) c	(115) d	(149) a
(14) c	(48) b	(82) d	(116) d	(150) c
(15) c	(49) c	(83) d	(117) d	(151) b
(16) c	(50) d	(84) b	(118) d	(152) c
(17) b	(51) d	(85) a	(119) b	(153) b
(18) d	(52) a	(86) a	(120) d	(154) a
(19) b	(53) b	(87) b	(121) c	(155) b
(20) b	(54) b	(88) d	(122) b	
(21) a	(55) a	(89) a	(123) d	
(22) b	(56) a	(90) a	(124) d	
(23) T	(57) b	(91) b	(125) d	
(24) d	(58) c	(92) b	(126) a	
(25) c	(59) c	(93) b	(127) a	
(26) c	(60) d	(94) c	(128) c	
(27) a	(61) d	(95) a	(129) b	
(28) d	(62) c	(96) a	(130) a	
(29) c	(63) b	(97) a	(131) a	
(30) c	(64) b	(98) d	(132) b	
(31) a	(65) b	(99) c	(133) d	
(32) c	(66) c	(100) b	(134) c	
(33) d	(67) a	(101) a	(135) c	
(34) b	(68) c	(102) c	(136) a	

•••

## Unit -V

### Chapter-22. Excretory Products and Their Elimination

#### IMPORTANT POINTS

- \* End of metabolic activities in organisms nitrogen waste material like ammonia, urea and ureic acid are produced.
- \* Excretion means the separation and elimination of Waste material from the body.
- \* Organisms are three type on the bases of excretory substances :
  - (i) Ammonotelic
  - (ii) Ureotelic
  - (iii) Ureotelic
- \* In human excretory organ is a pair of kidney, one urinary bladder and urethra.
- \* Kidney are reddish brown color, bean shaped and on either side of the vertebral column in the lumbar region. Each kidney is about 10cm long, 5 cm wide and 3 cm thick. In adult, it weight about 125-170 gm
- \* Each human kidney is containing about a million nephrons. Nephrons are referred to as the structural and the function units of the kidney. It known as uriniferous tubules.
- \* Each nephrons is about 3 cm long and 20-30 cm in diameter. Nephron consists of Bowman's capsule, proximal convoluted, henle's loops, distal convoluted and collecting duct.
- \* They comprise structure of glomerules and Brown's capsule is called malpighian corpuscles, where filtration of blood and urine formation is started.
- \* Urine formation involves three phase :
  - (i) Glomerular filtration
  - (ii) Re-absorption and
  - (iii) Tubular secretion.
- \* The function of the kidney is efficiently monitored and regulated hormonal feedback mechanisms involving mainly hypothalamus, pituitary, JGA and heart at certain extent.
- \* The normal urine is pale yellow colored watery fluid which is slightly acidic (pH-6.0) and with a characteristic odour. On an average 1 to 1.5 liter urine is produced per day, through it 25-30 gm of urea is excreted.
- \* Mammalian skin having sebaceous and sweat glands. Sebaceous gland discharge waxes, sterols, fatty acid and hydrocarbons, It lubricates the and prevents drying up of skin and wetting of hair. While sweat gland secretion is watery and consists of water, salts, mainly NaCl, urea, lactic acid, and little amino acid.

- \* Carbon dioxide and water are eliminated through human lungs. About 18 liter of CO<sub>2</sub> per hour and about 400 ml of water per day are removed by human lungs.
- \* By the disorders of excretion uremia, kidney failure, renal calculi and nephritis occurs.

MCQ

- (1) Which of the following is a metabolic waste of nitrogenous substances?
 

(a) NH <sub>3</sub> , urea, CO <sub>2</sub>	(b) NH <sub>3</sub> , uranine, urea
(c) Urea, NH <sub>3</sub> , creatinine	(d) Urea, oxygen, SO <sub>2</sub>
- (2) Excretion of nitrogenous waste product in remirolid form occurs in
 

(a) ureotelic animals	(b) Ammonotelic animals
(c) ureotelic animals	(d) amniotes
- (3) In man, urea is mainly produced in
 

(a) Liver	(b) Kidneys	(c) Gall bladder	(d) Spleen
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- (4) Ureotelism is found in
 

(a) Mammals	(b) Aquatic insects	(c) Tadpoles	(d) Birds
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- (5) Which of the following are uricotelic animals?
 

(a) Rohu and Frog	(b) Lizard and Crow
(c) Camel and Frog	(d) Earthworm and eagle
- (6) If liver from body is removed then which component of blood increases
 

(a) Ammonia	(b) Protein	(c) urea	(d) Uric acid
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- (7) Man is....
 

(A) Ureotelic	(b) Uricotelic	(c) Ammonotelic	(d) Both b and c
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- (8) Uric acid is formed in human from
 

(a) purines	(b) proteins	(c) glucose	(d) pyrimidines
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- (9) Green glands are excretory in function which are found in
 

(a) Spiders	(b) Moth	(c) Scorpions	(d) Prawn
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- (10) For maintenance of osmoregulation by animals where urea is stored?
 

(a) Medulla of Kidney	(b) Cortex of Kidney	(c) Renal pelvis	(d) Renal artery
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- (11) Excretory structure of earthworms is...
 

(a) Malpighian tubules	(b) Nephridia	(c) Kidney	(d) Anterior glands
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- (12) Those animals which excrete a large amount of NH<sub>3</sub> are...
 

(a) Terrestrial	(B) Egg laying	(c) Amphibians	(d) Aquatic
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- (13) "Columns of Bertini" in the kidney of mammals are found as the extension of
 

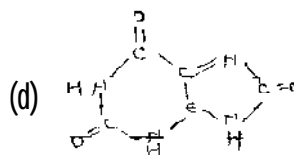
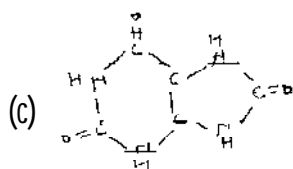
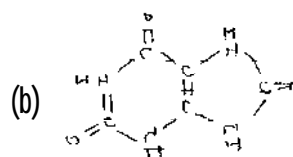
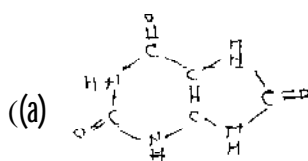
(a) Medulla into cortex	(b) Cortex into medulla	(c) Medulla into pelvis	(d) Pelvis into ureter
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- (14) Each human kidney has nearly...  
 (a) 10,000 neophrons (b) 50,000 neophrons  
 (c) 1,00,000 neophrons (d) 1 million neophrons  
 (d) CO<sub>2</sub>
- (15) ADH influences water permbeality in the  
 (a) Regulation of blood pressure (b) Removal of urea  
 (c) Regulation of acidity of fluids (d) secretion of antibiotics
- (16) Inner living of Bowman's capsule is lined by:  
 (a) Podocytes (b) Squamous calls (c) Microvilli (d) Colummar calls
- (17) Nitrogenous waste in the Malpighian tubule flows into...  
 (a) PCT (b) Intestine (c) Haemocoel (d) DCT
- (18) Urinary Excretion of Na is regulated by ....  
 (a) Anteroir pituitary (b) Posterior Pituitary (c) Adrenal cortex (d) Adenal medulla
- (19) The yellow colour of urine of the vertebrates in due to  
 (a) Cholesterol (b) Urochrome (c) Uric acid (d) Malamin
- (20) The glomerular filtration rate in a normal adult is nearly  
 (a) 200 ml/min (b) 250 ml/min (c) 125 ml/min (d) 170 ml/min
- (21) Sodium water and phosphate reabsorption is maximum in  
 (a) Loop of henle (b) PCT (c) DCT (d) Collecting tuble
- (22) What is the approximately length and diameter of uriniteros tubule?  
 (A)3 cm length,diameter 35um  
 (B)3 cm length,diameter 20.30um  
 (C)30 cm length,diameter 25um  
 (D)25 cm length,diameter 20um
- (23) Urea formation occure by:  
 (a) Arginine cycle (b) Krebs cycle(c) Ornithine cycle (d) Citulline cycle
- (24) Ornithine cycle ic found in...  
 (a) Kidney (b) Liver (c) Spleen (d) Pencreas
- (25) Function of loop of Henle is...  
 (a) Formation of urine (b) Passage of urine  
 (c) Conservation of water (d) Filtration of blood
- (26) Ascending loop if henle is perneable to:  
 (a) K<sup>+</sup> (b) Cl<sup>-</sup> (c) Na<sup>+</sup> (d) All of above
- (27) Proboscis gland is balanoglossus is associated with  
 (a) Digestion (b) Excretion (c) Circulation (d) Respiration



- (28) The appearance of albumin in the urine is most likely due to..  
 (a) Increase in blood pressure (b) Decrease in the blood osmotic pressure  
 (c) Damage to the Malpighian corpuscles (d) Damage to the PCT
- (29) The blood constituents that remain unchanged in quality after circulating through the kidneys are...  
 (a) Urea and glucose (b) Glucose and proteins (c) Urea and proteins (d) Urea and uric acid
- (30) The renal vein carries blood  
 (a) Towards liver (b) Into the kidney  
 (c) Away from the kidney (d) Towards urinary bladder
- (31) Animals which cannot maintain their osmotic environment at a constant level are called  
 (a) Osmoregulators (b) Osmoconformers (c) Poikilotherms (d) Homeotherms
- (32) The Organism which maintain an independent concentration of their extracellular fluids  
 (a) Osmoconformers (b) Osmoregulators (c) a & b both (d) None of above
- (33) The mechanism of urine formation in nephron involves  
 (a) Ultrafiltration (b) Secretion (c) Reabsorption (d) All of above
- (34) As compared to efferent arteriole the afferent arteriole of kidney is  
 (a) Shorter and wider (b) Shorter and narrower  
 (c) Longer and wider (d) Longer and narrower
- (35) Diabetes insipidus is due to  
 (a) Hyposecretion of vasopressin (b) Hyposecretion of insulin  
 (c) Hyposecretion of insulin (d) Hyposecretion of vasopressin
- (36) Inflammation of joints due to accumulation of uric acid crystals is called as ...  
 (a) Gout (b) Myasthenia gravis  
 (c) Osteoporosis (d) Osteomalacia
- (37) Protein rich diet brings about relatively no change in one of the following constituents of urine  
 (A) Urea (b) Creatinine (c) Uric acid (D) Ammonium salts
- (38) The least toxic nitrogen waste of urine is  
 (a) Ammonia (b) Allantois (c) Urea (d) Uric acid
- (39) Deamination is a process in which ...  
 (a) Poisonous urea is removed from the blood and it occurs in kidney  
 (b) Amino acid is absorbed from the digested food and it occurs in the intestine  
 (c) Amino acid combined with ammonia to form protein  
 (d) Amino acid broken down to release  $\text{CO}_2$  and  $\text{NH}_2$

- (40) Find the incorrect statement regarding mechanism of urine formation in man  
 (a) The glomerular filtration rate is about 125 ml/min  
 (b) Tubular secretion takes place in the PCT  
 (c) Aldosterone induces greater reabsorption of sodium  
 (d) The counter current system contributes in diluting the urine
- (41) Transamination process takes place in  
 (a) Liver                                      (b) Kidney                                      (c) Heart                                      (d) All of above
- (42) Structural formula of uric acid is .....



- (43) According to solubility in water  
 (a)  $\text{NH}_3 > \text{uric acid} > \text{urea}$                                       (b)  $\text{NH}_3 > \text{urea} > \text{uric acid}$   
 (c)  $\text{Uric acid} > \text{urea} > \text{NH}_3$                                       (d)  $\text{Uric acid} > \text{NH}_3 > \text{urea}$
- (44) Passage of urine  
 (a) Duct of belini - urethra - ureters - urinarray bladder  
 (b) Urinary bladder - urethra - urters - calyces  
 (c) Duct of ballini - calyces - urethra - urinary bladder  
 (d) Duct of bellini - calyces - ureters - urinary bladder
- (45) How many  $\text{NH}_3$  required for a urea...  
 (a) 1                                      (b) 2                                      (c) 3                                      (d) 4
- (46) Loop of henle and collecting ducts are locketed in kidney is....  
 (a) Cortex                                      (b) Medulla pyramid                                      (c) Columns of bertini                                      (d) Calyces
- (47) The nature of nitrogenous waste and their excretion depend on the large amount of  
 (a)  $\text{C}_6\text{H}_{12}\text{O}_6$                                       (b)  $\text{NH}_2\text{CONH}_2$                                       (c)  $\text{H}_2\text{O}$                                       (d)  $\text{CO}_2$
- (48) A process takes place in PCT is  
 (a) Absorption of  $\text{H}^+$  to maintain PH  
 (b) Secretion of buffer  $\text{HCO}_3$   
 (c) Reabsorption of  $\text{NACL}$   
 (d) Secretion of urea

- (49) In cortical nephrones (LOH = Loop of henle)  
 (a) LOH is long (b) collecting tubule is short  
 (c) LOH is short (d) Absence of LOH
- (50) Peritubular is in  
 (a) Cortex (b) Deep in medulla (c) Calyces (d) Surround to duct of Bellini
- (51) Osmolarity of interstitial fluid in cortex is  
 (a) 1200 mosmol L<sup>-1</sup> (b) 900 mosmol L<sup>-1</sup> (c) 600 mosmol L<sup>-1</sup> (d) 300 mosmol L<sup>-1</sup>
- (52) Urine produced by human kidney is concentrated by \_\_\_\_\_ times than the initial filtrate formed  
 (a) 2 (b) 300 (c) 4 (d) 1200
- (53) Involved mainly in RAAS  
 (a) Angiotensin (b) Aldosterone (c) Renin (d) All of these
- (54) Function of ANF is  
 (a) Increase the blood pressure (b) Decrease the blood pressure  
 (c) Diluting the blood (d) Concentrating the blood
- (55) Renin is secreted by  
 (a) PCT (b) DCT (c) LOH (d) JG cells
- (56) In Amoeba ammonia is excreted by  
 (a) Food vacuole (b) Contractile vacuole (c) Plasma membrane (d) All of these
- (57) Angiotensinogen I is secreted by  
 (a) Pancreas (b) JG cells (c) Liver (d) Kidney
- (58) Angiotensinogen is converted to Angiotensin by  
 (a) dil HCl (b) casein (c) Renin (d) Hippuric acid
- (59) Secretion of renin from JG cell is due to  
 (a) A fall glomerular blood flow (b) glomerular blood pressure  
 (c) GFR (d) All of these
- (60) ADH is secreted by  
 (a) Liver (b) Neurohypophysis (c) Kidney (d) JG cells
- (61) It is also activate the adrenal cortex to release aldosterone  
 (a) Angiotensin II (b) Adrenal gland (c) Cortisol (d) ADH
- (62) It is activated as the change of blood volume and volume of body fluid  
 (a) Medulla oblongata (b) Osmoreceptor (c) Aorta (d) Renal vein
- (63) It increases excretion of Ca<sup>2+</sup> in the kidney  
 (a) Prostaglandin (b) Renin (c) Thyrocalcitonin (d) Angiotensin

- (64) Elimination of insoluble calcium phosphate takes place by  
 (a) Kidney                      (b) Liver                      (c) Lungs                      (d) Large intestine
- (65) The function of renin is  
 (a) Degradation of angiotensinogen                      (b) Stimulation of corpus luteum  
 (c) To reduce blood pressure                      (d) Vasodilation
- (66) For release of Urine  
 (a) Urinary track contracts                      (b) Urinary track relaxes  
 (c) Ureter relaxes                      (d) Ureter contracts
- (67) Presence of blood in urine is known as  
 (a) Glycosuria                      (b) Aoligourea                      (c) Hemetourea                      (d) Kitonurea
- (68) Presence of excessive amount urea in blood is known as  
 (a) Uremia                      (b) Hemeturia                      (c) Diurea                      (d) Aniurea
- (69) Longest loop of henle is found in  
 (a) Kangaroo rat                      (b) Rhesus monkey                      (c) Dog                      (d) Frog
- (70) Marine teleost fishes excrete  
 (a) Uric acid                      (b) Ammonia                      (c) Urea                      (d) None of these
- (71) Sebaceous glands discharge  
 (a) Water, salts, NaCl, Lactic acid                      (b) Water, salts, NaCl, Fatty acid  
 (c) Water, sterols, fatty acid hydrobarbos                      (d) Water, sterols, latic acid, NaCl
- (72) Sweat gland secretion consist of  
 (a) Water, salts, NaCl, Lactic acid                      (b) Water, salts, NaCl, Fatty acid  
 (c) Water, sterols, fatty acid hydrobarbos                      (d) Water, sterols, latic acid, NaCl
- (73) Kidney are  
 (a) Yellowish brown    (b) Reddish brown    (c) Greenish yellow    (d) Grey in colour
- (74) kidney in human being occurs in the region of:  
 (a) 10<sup>th</sup> thoracic and first lumbar vertebra                      (b) 12<sup>th</sup> thoracic and second lumbar vertebra  
 (c) 11<sup>th</sup> thoracic and third lumbar vertebra                      (d) 9<sup>th</sup> thoracic and fourth lumbar vertebra
- (75) (1) In human being  $\text{NH}_3$  is converted in urea in liver  
 (2) Insect birds and land nail are ureotelic  
 (3) A small amount of water is wasted in excretion of ammonia however not much energy is used in doing so.  
 (4) More energy is required in the preparation of urea but not a large amount of water is needed to be lost  
 (a) TFFF                      (b) TFFT                      (c) TTFT                      (d) TTTF

- (76) (1) The outer surface of the kidney is concave while inner is convex  
 (2) The projection of renal pelvis are called collecting duct  
 (3) Renal columns called columns of bertini  
 (4) Afferent renal arterioles are narrower then efferent renal arteriioles  
 (a) FFTF (b) FTTF (c) FFTT (d) FTFF
- (77) (1) In PCT the filterate is hypertonic to nblood plasma  
 (2) In DCT the filterrte is hypertonic to blood plasma  
 (3) Decending limb of LOH is permecable to water but nearly imperable to salts  
 (4) Ascending limb of LOH is Segment to water but nearly imperable to salts  
 (a) FTFT (b) FTTF (c) TFFT (d) FFTF
- Match the items of columns I with those of column II

(78)

**Column I**

**column II**

- |                 |  |
|-----------------|--|
| (P) Uremia      | (i) excee of protein level in urine          |
| (Q) Haematuria` | (ii) Presence of high Ketone bodies in urine |
| (R) Ketonuria   | (iii) Presence of blood cells in urine       |
| (S) Glucosuria  | (iv) presence of glucose in urine            |
| (T) proteinuria | (v) presence of urea in blood                |

- |     | P  | Q   | R   | S  | T  |
|-----|----|-----|-----|----|----|
| (a) | v  | iii | iv  | ii | i  |
| (b) | v  | iii | ii  | i  | iv |
| (c) | iv | v   | iii | ii | i  |
| (d) | v  | iii | ii  | iv | i  |

(79)

**Column I**

**column II**

- |                             |                              |
|-----------------------------|------------------------------|
| (P) Ultrafiltration         | (i) Henle's loop             |
| (Q) concentratyion of urine | (ii) Ureter                  |
| (R) transport of urine      | (iii) urinary bladder        |
| (S) storage of urine        | (iv) Malipigian corpuscles   |
|                             | (v) Proxmal convoluid tabule |

- |     | P  | Q  | R   | S   |
|-----|----|----|-----|-----|
| (a) | v  | ii | iii | iv  |
| (b) | iv | i  | iii | ii  |
| (c) | iv | i  | ii  | iii |
| (d) | i  | ii | iii | iv  |

(80)

**Column I**

- (P) Excretory oragans
- (Q) Nephiridia
- (R) Malpighian tubles
- (S) Kidneys

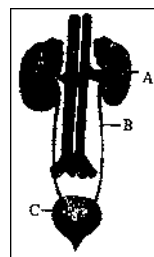
**column II**

- (i) Hydra
- (ii) Leech
- (iii) Shark
- (iv) Lound warms
- (v) cockroach

	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>
(a)	ii	v	iii	iv
(b)	ii	v	iv	iii
(c)	ii	iv	v	iii
(d)	ii	i	iii	iv

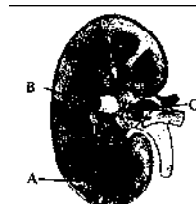
(81) In given figure represent A.B.C. respectively

- (a) Kidney, ureter, urinary bladder
- (b) Adrinal gland, urinary blader, urethra
- (c) Urinary bladder, kidney, ureter
- (d) Bloodvessel, kidney, urinary bladder



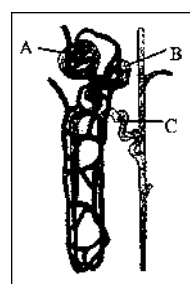
(82) In given figure represent A.B.C. respectively

- (a) Cortex, pelvis, ureter
- (b) Cortex, columnof bertiny, renel pelvis
- (c) Cortex, renal pelvis, renalvein
- (d) Cortex, renalpyramid, renal pelvis



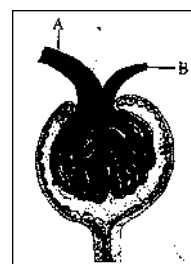
(83) In given figure represent A.B.C. respectively

- (a) Malpighianbody, DCT, PCT
- (b) Glomerulus, PCT, DCT
- (c) Glomerulus, loop of henle, DCT
- (d) Glomerulus, loop of henle, PCT



(84) In given figure represent A.B.C. respectively

- (a) Afferent vensual Efferent vensual
- (b) Efferent vensual Afferent vensual
- (c) Afferent arterrole Efferent vensual
- (D )Afferent arterrole Efferent arterrole



**Question based on various competitive Examination:-**

- (85) Main function of uriniferous tubules ( MP PMT 1990)  
 (a) Concentration of urine  
 (b) Passage of urine  
 (c) Reabsorption of useful substances from glomerular filtrate  
 (d) Removal of urea and other waste from blood
- (86) The mechanism of urine formation in nephron involves (CPMT 1992)  
 (a) Ultrafiltration (b) Secretion  
 (c) Reabsorption (d) All of above
- (87) Which hormone induced the process of reabsorption from glomerular filtrate? (JKCMMME 92)  
 (a) Oxytocin (b) Vasopressin (c) Renin (d) Calcitonin
- (88) Glucose is reabsorbed from glomerular filtrate through (CBSE 1993)  
 (a) Active transport (b) Passive transport (c) Osmosis (d) Diffusion
- (89) Excretory product of birds and reptiles is (CPMT 1998)  
 (a) Urea (b) Uric acid (c) Ammonia (d) Creatinin
- (90) Part not belonging to uriniferous tubule is (CBSE 1994)  
 (a) Glomerules (b) Henle's loop  
 (c) Distal convoluted tubule (d) Connecting tubule
- (91) The two kidneys lie: (MP PMT 1995)  
 (a) At the level of ovaries  
 (b) At the same level  
 (c) Left kidney at a higher level than the right one  
 (d) Right kidney at a higher level than the left one
- (92) Which blood vessel takes blood away from kidney? (DPMT 1996)  
 (a) Renal portal vein (b) Renal vein (c) Afferent arteriole (d) Efferent arteriole
- (93) Which hormone influences the activity of kidney? ( BHV 1996)  
 (a) Vasopressin (b) Thyroxine (c) Vasopressin & aldosterone (d) Gonadotrophin
- (94)  $\text{Na}^+$  and  $\text{Cl}^-$  are absorbed in kidney in the region of  
 (a) Ascending limb of Henle's loop (b) descending limb of Henle's loop  
 (c) DCT (d) PCT
- (95) Blood which leaves liver and passes towards heart has higher concentration of (BHU 1999)  
 (a) Bile (b) Oxygen (c)  $\text{RBC}_s$  (d) Urea
- (96) Urea is transformed through (AIIMS 2000)  
 (a)  $\text{RBC}_s$  (b)  $\text{WBC}_s$  (c) blood plasma (d) All of above

- (97) A person undergoing prolonged fasting his urine will be found to contain abnormal quantities of  
(MP PMT 2005)  
(a) Fats            (b) Amino acid            (c) Glucose            (d) Ketones
- (98) The net pressure gradient that causes the fluid to filter out of the glomerulus into the capsule is  
(PMT 2005)  
(a) 50 mm hg            (b) 75 mm hg            (c) 20 mm hg            (d) 30 mm hg
- (99) In ornithine cycle which of the following wastes are removed from the blood? (PMT 2005)  
(a) CO<sub>2</sub> and urea            (b) Ammonia and urea            (c) CO<sub>2</sub> and ammonia            (d) Urea and urine
- (100) Angiotensinogen is a protein produced and secreted by.. (AIPMT 2006)  
(a) Juxta glomerular (JG) cells            (b) Macula densa cells  
(c) Endothelial cells of blood vessels            (d) Liver cells
- (101) A person who is on a long hunger strike and is surviving only on water will have (AIPMT 07)  
(a) Less amino acids in his urine            (b) More glucose in this blood  
(c) Less urea in his urine            (d) More sodium in his urine
- (102) What will happen if the stretch receptors of the urinary bladder wall are totally removed?  
(a) Micturition will continue            (b) Urine will continue to collect normally in the bladder  
(c) There will be no micturition            (d) Urine will not collect in the bladder
- (103) Uric acid is the chief nitrogenous component of the excretory product of (AIIPMT 2009)  
(a) Earthworm            (b) Cockroach            (c) Frog            (d) Man
- (104) Which one of the following statements is impermeable to water  
(a) Descending limb of loop of Henle is impermeable to water  
(b) DCT is incapable of reabsorbing HCO<sub>3</sub><sup>-</sup>  
(c) Nearly 99% of the glomerular filtrate is reabsorbed by the renal tubules  
(d) Ascending limb of loop of Henle is impermeable to water
- (105) The principal nitrogenous excretory compound in human is synthesised (AIIPMT 2010)  
(a) In kidney but eliminated mostly through liver  
(b) In kidney as well as eliminated by kidneys  
(c) In the liver but eliminated mostly by kidneys  
(d) In the liver and also eliminated mostly by the same bile
- (106) Which of the following is not a part of a renal pyramid?  
(a) Peritubular capillaries            (b) Coiled tubules  
(c) Collecting ducts            (d) Loop of Henle's
- (107) Uricotelic mode of excreting nitrogenous waste is found in (AIIPMT 2011)  
(a) Reptiles and birds            (b) Birds and annelids  
(c) Amphibians and reptiles            (d) Insects and amphibians



- (108) A fall in glomerular filtration rate (GFR) (AIIPMT 2012)  
 (a) Juxtaglomerular cells to release renin  
 (b) Adrenal cortex to release aldosterone  
 (c) Adrenal medulla to release adrenaline  
 (d) Posterior pituitary to release ADH
- (109) Haemodialysis is also called as artificial: (HarPMT 2002, Kerala 2002)  
 (a) Liver (b) Lung (c) Heart (d) Kidney
- (110) which one is an accessory excretory organ? (CET chd 2002)  
 (a) Liver (b) Stomach (c) intestine (d) Heart
- (111) Part of nephron involved in active reabsorption of sodium is (JIPMER 2002)  
 (a) PCT (b) Ascending limb of Henle's loop (c) Bowman's capsule (d) DCT
- (112) Haemodialysis helps the patient having (JIPMER 2004)  
 (a) Goitre (b) Anaemia (c) Uremia (d) Diabetes
- (113) Lungs expel (MH 2005)  
 (a) CO<sub>2</sub> (b) H<sub>2</sub>O  
 (c) CO<sub>2</sub> and water (d) CO<sub>2</sub> and water vapours
- (114) The glomeruli are continued to the (CPMT 88)  
 (a) Medulla (b) Calyces  
 (c) Cortex (d) Renal Pelvis
- (115) The kidney of adult mammals are (MP PMT 99)  
 (a) Opisthonephron (b) pronephros (c) Mesonephros (d) metanephros
- (116) A kidney stone is (CPMT 88, Manipal 05)(Kerala 2003)  
 (a) Blockage by fats  
 (b) Deposition of sand in kidney  
 (c) A salt such as Oxalate crystallised in pelvis  
 (d) Blockage by proteins
- (117) Which of the following is both osmoregulator as well as nitrogenous product (DPMT 07)  
 (a) NH<sub>3</sub> (b) Urea (c) Uric acid (d) All of these
- (118) which of these is not a ketone body (CPMT 04)  
 (a) Acetoacetic acid (b) Acetone (c) Succinic acid (d) β-ketobutyric acid
- (119) Maximum reabsorption of useful substance occurs in the region of nephron:  
 (a) Henle's loop (b) Glomerulus (c) PCT (d) DCT
- (120) Excretory organs of cockroach are (Kerala PMT 07)  
 (a) Malpighian corpuscles (b) Malpighian tubules  
 (c) Hepatic caecae (d) Green glands

- (121) Consider the following statement:  
 A. Flame cells are excretory structures of flat worms  
 B. Green glands are excretory organs of annelids  
 C. Columns of Bertini are conical projections of renal pelvis into renal medulla between the renal pyramids  
 (a) A and B correct    (b) B and C incorrect  
 (c) A and C incorrect    (d) B and C correct
- (122) Juxta glomerular cells of renal cortex synthesize a hormone called: (BHV 2007)  
 (a) ADH                      (b) Oxytocin                      (c) Renin                      (d) Urochrom
- (123) RAAS secretes which of the following hormones?  
 (a) Mineralocorticoids    (b) glucocorticoids  
 (c) Both A and B            (d) None of these
- (124) Which blood vessel carries least amount of urea? (HAR PMT 2005)  
 (a) Pulmonary vein    (b) Renal artery    (c) Renal vein    (d) Hepatic portal vein
- (125) Kidney stone are (Kerala PMT 2003)  
 (a) Crystals of silica    (b) crystals of NaCl    (c) Crystals of Oxalate    (d) Crystals of  $\text{NaHCO}_3$
- **Assertion & reason** Read the assertion and reason carefully to mark the correct option out of the option given below  
 (a) If both the 'A' and 'R' true and 'R' is a correct explanation of 'A'  
 (b) If both the 'A' and 'R' true and 'R' is not a correct explanation of 'A'  
 (c) If A is true the R is false  
 (d) If A is false the R is true
- (126) A: Ammonia should be eliminated from the body as rapidly as it is formed.  
 R: Ammonia is insoluble in water.  
 (a)                      (b)                      (c)                      (d)
- (127) A: Aquatic mammals like whales and seals are said to be ureotelic animals.  
 R: It is because of the fact that their main nitrogenous waste product is urea.  
 (a)                      (b)                      (c)                      (d)
- (128) A: In the descending limb of loop of henle the urine is hypertonic while in ascending limb of loop of henle the urine is hypotonic.  
 R: Descending Limb is impermeable to  $\text{Na}^+$  while ascending limb is impermeable to  $\text{H}_2\text{O}$ .  
 (a)                      (b)                      (c)                      (d)
- (129) A: The antidiuretic hormone increases the water permeability of distal convoluted tubule.  
 R: In absence of ADH water reabsorption is considerably reduced.  
 (a)                      (b)                      (c)                      (d)

- (130) A: Urea is a less toxic excretory substance comparatively to uric acid.  
R: Birds and insect are uricetolic animals.  
(a) (b) (c) (d)
- (131) A: Mammals living in deserts contain more concentrated urine.  
R: They contain very long loop of Henle in their nephrons.  
(a) (b) (c) (d)
- (132) A: Most excretory substance are in soluble in water in human.  
R: Water itself considered a waste product.  
(a) (b) (c) (d)
- (133) A: Durring physiology of excretion deamination take place in liver.  
R: The process of excretion of ammonia is called ammonotelism.  
(a) (b) (c) (d)
- (134) A: Utilization of water and consumption of energy for elimination of waste product are inversely proportional.  
R: Ammonia is the less toxic and can be eliminated with large ammount of water.  
(a) (b) (c) (d)
- (135) A: Left Kidney is situated slight lower than right kidney.  
R: The right side of the andominal cality is occupied by liver.  
(a) (b) (c) (d)



**ANSWER KEY**

1	c	26	d	51	d	76	a	101	c	126	c
2	c	27	b	52	c	77	d	102	d	127	a
3	a	28	c	53	d	78	d	103	b	128	a
4	a	29	b	54	b	79	c	104	c	129	b
5	b	30	c	55	d	80	b	105	c	130	d
6	a	31	b	56	b	81	a	106	b	131	a
7	b	32	b	57	c	82	b	107	a	132	c
8	a	33	d	58	c	83	b	108	a	133	b
9	d	34	a	59	d	84	d	109	d	134	c
10	a	35	a	60	b	85	a	110	a	135	d
11	b	36	c	61	a	86	d	111	b		
12	d	37	d	62	b	87	b	112	c		
13	b	38	d	63	c	88	a	113	d		
14	d	39	d	64	d	89	b	114	c		
15	b	40	d	65	a	90	d	115	d		
16	d	41	a	66	b	91	c	116	c		
17	b	42	a	67	c	92	b	117	b		
18	c	43	b	68	a	93	c	118	c		
19	b	44	d	69	a	94	a	119	c		
20	c	45	b	70	d	95	d	120	b		
21	b	46	b	71	b	96	c	121	b		
22	b	47	c	72	c	97	d	122	c		
23	c	48	c	73	b	98	c	123	a		
24	b	49	c	74	b	99	c	124	c		
25	c	50	a	75	c	100	d	125	c		



## Unit :- V

### Chapter-23. Locomotion and Movement

#### IMPORTANT POINTS

- Movement is one of the significant features of all living organism. Movement of flagella, cilia and tentacles are shown by many living animals. Human beings can move jaws, eyelids, tongue, limbs etc.
- Some of the movement bringing change of place or position such voluntary movements are called locomotion. Running, walking, flying, swimming, climbing are the examples of it.
- Three type of locomotion : amoeboid, ciliary and muscular. Organisms locomote commonly for shelter, search of food, escape from enemies or predators, mate, suitable breeding grounds or favorable climate conditions.
- Muscles are mesoderm origin. Three types of it : (1) Striated muscles tissue (2) Non-striated muscles tissue 3. Cardiac muscles tissue.
- In the structure of striated muscles dark band and light band is found. It function under the voluntary control of the nervous system. In the non-striated muscles there are no transverse stripes. They functioning under autonomic nervous system. Cardiac muscles having intercalated; disc. Its contraction is rhythmically and controlling and blood supply is abundant.
- In striated muscle tissue A, I, H, Z bands are found. A-band made up by myosin and I-band by actin. The distance between two successive Z-band is called sarcomere. It is the functional unit of striated muscle.
- The hard, supportive system used to protect soft organ of body, The study of skeleton is called osteology. The important role of skeletal system is for locomotion & movement of body parts. The structure of skeleton system consists of bones and cartilage type connective tissue.
- In human skeleton system made up by 206 bones and a few cartilage. It is divided into main two parts (1) Axial skeletal system (2) Appendicular skeleton system.
- Axial skeleton constitute the skull, vertebral column, sternum and ribs. It is located in longitudinal axis of body and made up by 80 bones.
- The bones of the limbs along with their girdles constitute the appendicular skeleton. In the appendicular skeleton fore limb bones and hind limb bones are included. Each limb made up by 30 bones. In girdles; pectoral girdle and pelvic girdle are included.
- The structural arrangement of tissues which connects two or more bones together at their place of meeting is termed as joint. Joints are essential for all types of movements involving the bony part of body.
- **Joints classified into three types :** (1) Immovable or fibrous joints. (2). Cartilagenous joint and (3) Freely movable joints.

#### Disorders Related to Bones :

- **Rheumatoid Arthritis :** A probability exists of arthritis in synovial joints. In this disease, the synovial membrane becomes inflamed. It becomes thick. Degradatory changes occur and joint becomes almost immobile. It becomes very painful when movement occur. There is evidence that the autoimmune reaction is responsible for this.
- **Osteoarthritis :** Osteoarthritis occurs in aged persons. In this disease, the cartilage on the head

of the head of the bones become degraded. As this occurs, the ends of two bones which are near each other become rough and reshaped. Osteoarthritis occurs in such joints which are used most often. which is more common in hands, knee and vertebral column.

- **Gouty Arthritis :** Gouty arthritis occurs due to excessive, accumulation of uric acid in joints. The amount of uric acid increases due to irregularities of metabolism. It accumulates in joints and combines with the sodium salts. Their crystals become collected in joints and induce inflammation. Pain results. Probability of joint becoming immobile.
  - **Osteoporosis :** This a disease of increasing porosity of bones with increasing age. This disease is an outcome of imbalance between activities of osteoblasts (bone forming cells) and osteoclasts (bone destroying cells.)
- Disorders Related to Muscles :**
- **Myasthenia Gravis :** It is an auto immune disorder that effects neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscle.
  - **Tetany :** It is a muscular disorder in which rapid spasms in muscle occur due to lesser  $Ca^{+2}$  in the body fluid.

**For the given options select the correct options (a, b, c, d) each carries one mark.**

1. What is important character of all living organism ?  
(a) Movement                      (b) Locomotion                      (c) Reproduction                      (d) All a, b, c.
2. Which is not a example of movement in human ?  
(a) Movement of jaws                      (b) Movement of eyelash and tongue  
(c) Movement of appendices                      (d) Hearing process
3. By which Amoeba, Paramecium and Hydra respectively indicate movement ?  
(a) Pseudopodia, cilia, tentacles                      (b) Cilia, flagella, tentacles  
(c) Tentacles, Cilia, Pseudopodia                      (d) Cilia, Tentacles, Pseudopodia
4. Which are the example of autonomous movement in organism ?  
(a) Running, Walking                      (b) Flying, Swimming                      (c) Gliding, Sliding                      (d) All a, b, c.
5. By which process performs plant movement its parts ?  
(a) Phototropism                      (b) Geotropism                      (c) Chemotropism                      (d) All a, b, c.
6. What are the main aims of locomotion in animal ?  
(a) For shelter, search of food                      (b) For the escape of enemy, for predation  
(c) To get a place for reproduction                      (d) All a, b, c.
7. What is not included in the type of the movement in organisms ?  
(a) Amoeboid movement                      (b) Ciliary movement  
(c) Muscular movement                      (d) joining process
8. Who shows amoeboid movement ?  
(a) Amoeba                      (b) Leucocytes                      (c) Macrophage                      (d) All a, b, c.
9. In which of the following ciliary movement can be seen ?  
(a) In trachea                      (b) In oviduct                      (c) In vasa efferentia                      (d) All a, b, c.

10. From which germinal layer muscle tissue origins ?  
 (a) Ectoderm                      (b) Mesoderm                      (c) Endoderm                      (d) All a, b, c.
11. What percent of the total body weight of an adult humans is made up of muscle ?  
 (a) 40 - 50 %                      (b) 30 - 40 %                      (c) 60 - 70 %                      (d) 45 - 55 %
12. Which are characteristic properties of muscles ?  
 (a) Electricity, excitability                      (b) Contractility  
 (c) Extensibility, elasticity                      (d) All a, b, c.
13. How many type of muscles in living organisms  
 (a) 1                      (b) 2                      (c) 3                      (d) 4
14. Which types of muscles are present in organisms ?  
 (a) Striated muscle                      (b) Visceral muscle                      (c) Cardiac muscle                      (d) All a, b, c.
15. Which muscle is controlled by autonomous nervous system ?  
 (a) Striated muscle                      (b) Visceral muscle                      (c) Cardiac muscle                      (d) All a, b, c.
16. Which muscle is controlled by sympathetic nervous system ?  
 (a) Striated muscle                      (b) Cardiac muscle                      (c) Non Striated muscle                      (d) All a, b, c.
17. Which muscle is present in digestive track, reproductive track and respiratory track ?  
 (a) Visceral muscle                      (b) Non Striated muscle                      (c) Voluntary muscle                      (d) All a, b, c.
18. Which band is present in Cardiac muscle ?  
 (a) Intercalated disc                      (b) A- band                      (c) I-band                      (d) All a, b, c.
19. Which muscle does not fatigue and possesses abundant blood supply during life span ?  
 (a) Striated muscle                      (b) Non Striated muscle  
 (c) Skeleton muscle                      (d) a and b both
20. Which muscle possesses multinucleate structure (Syncytium) ?  
 (a) Striated muscle                      (b) Skeleton muscle  
 (c) Non Striated muscle                      (d) a and b both
21. By which name's isotropic and anisotropic band respectively known ?  
 (a) I - band, A - band                      (b) I - band, Intercalated-dise  
 (c) A - band, Z - band                      (d) H - band, Z - band
22. Which line is located in the center of H region ?  
 (a) Krause membrane                      (b) M- line                      (c) Z - band                      (d) Hensen's line
23. The space between two successive Z-band is known as.....  
 (a) A - band                      (b) I - band                      (c) Krause membrane                      (d) Sarcomere
24. Which band is called krause membrane ?  
 (a) A                      (b) Z                      (c) I                      (d) H
25. The functional unit of skeleton muscle is called as.....  
 (a) Myofibrils                      (b) Sarcomere                      (c) Hensen's line                      (d) Krause membrane
26. What is the name of rod shaped fibrous protein ?  
 (a) Troponin                      (b) Actin                      (c) Tropomyosin                      (d) Meromyosin

27. Which are two forms of actin fiber ?  
 (a) Monomer-G- protein (b) Polymeric H- actin (c) Polymeric F-actin (d) a and c both
28. What the is name of complex, small globular protein ?  
 (a) Troponin (b) Tropomyosin (c) Actin (d) Meromyosin
29. Which is the essential mineral element for muscle contraction ?  
 (a)  $\text{Ca}^{++}$  (b)  $\text{Mg}^{++}$  (c)  $\text{K}^+$  (d)  $\text{Na}^+$
30. Which is essetial for transmission of messages ?  
 (a) Adrenalin (b) Acetylcholine (c) Norqdrenalin (d) Vasopressin
31. Which chemical is envolved duribg anaerobic respiration of glycogen of muscle ?  
 (a) Ethy alcohol (b) Lactic acid (c)  $\text{Co}_2$  (d) a and c both
32. Which chemical is responsible to make skeleton muscle fatigue ?  
 (a) Lactic acid (b) Pyruvic acid (c) Ethyl alcohol (d) Acetaldehyde
33. Which is/are the type of skeleton muscle ?  
 (a) Red muscle (b) White muscle (c) Non-striated muscle (d) a and b both
34. In which muscle amount of myoglobin is high ?  
 (a) Red muscle (b) White muscle (c) Non-striated muscle (d) a and b both
35. Which muscle is known as an aerobic muscle ?  
 (a) Red muscle (b) White muscle (c) Non-striated muscle (d) a and b both
36. The study of skeleton system is called as.....  
 (a) Myology (b) Cardiology (c) Osteology (d) Histology
37. By which tissue skeleton system is made up of ?  
 (a) Epithelial tissue (b) Connective tissue (c) Nervous tissue (d) Muscle tissue
38. How many bones are present in the struture of skeleton system of human ?  
 (a) 206 (b) 210 (c) 308 (d) 146
39. What is included in axial skeleton ?  
 (a) Skull and vertebral column (b) Ribs  
 (c) Sternum (d) a and b both
40. What is included in the structure of skull ?  
 (a) Bones of cranium (b) Bones of face (c) Sternum (d) a and b both
41. How many bones, the skull is made of ?  
 (a) 23 (b) 22 (c) 21 (d) 20
42. How many flat bones are present in a cranium ?  
 (a) 6 (b) 8 (c) 10 (d) 12
43. Who makes the floor of the buccal cavity ?  
 (a) Hyoid bone (b) Vomer (c) Mandible (d) Frontal
44. How many bone are present in each middle ear of human ?  
 (a) 3 (b) 4 (c) 6 (d) 8



45. How many vertebrae are present in the structure of vertebral column of human ?  
 (a) 26 (b) 33 (c) 38 (d) 29
46. Where cervical vertebrae are found ?  
 (a) Thorax region (b) Lumbar region (c) Throat (d) Tail
47. What is the formula of human vertebrae ?  
 (a)  $C_7T_{12}L_5S_5C_4$  (b)  $C_2T_{10}L_4S_5C_4$   
 (c)  $C_7T_{12}L_4S_4C_5$  (d)  $C_6T_{11}L_7S_5C_4$
48. Which flat bone is present in the middle line of thorax region of human ?  
 (a) Sternum (b) Collar (c) Vertebral column (d) Femur
49. How many pairs of ribs are found in human ?  
 (a) 12 (b) 14 (c) 18 (d) 24
50. How many true pairs of ribs are found in human ?  
 (a) 7 (b) 6 (c) 8 (d) 10
51. How many False pairs of ribs are found in human ?  
 (a) 2 (b) 7 (c) 8 (d) 9
52. Which are floating rib in human ?  
 (a) 11th and 12th (b) 9th and 10th (c) 7th and 8th (d) 5th and 7th
53. What is the number of thoracic vertebrae in human ?  
 (a) 12 (b) 5 (c) 7 (d) 8
54. What is the number of bones present in each leg of human ?  
 (a) 30 (b) 35 (c) 25 (d) 40
55. What is the formulae of phalanges of hand and leg of human ?  
 (a) 2,3,3,3,3 (b) 0,2,2,3,3 (c) 2,2,3,3,3 (d) 0,2,3,3,3
56. What are the number of tarsal and metatarsal respectively in each limb of human ?  
 (a) 5, 7 (b) 7, 5 (c) 8, 3 (d) 5, 14
57. How many bones are present in the axial skeleton of human ?  
 (a) 80 (b) 100 (c) 125 (d) 106
58. How many numbers of carpals and metacarpals are present respectively in each forelimb of human ?  
 (a) 8,5 (b) 5,8 (c) 10,8 (d) 14, 30
59. By which bone half part of the pectoral girdle is made ?  
 (a) Clavicle (b) Scapula (c) a and b (d) Sternum
60. By which structure complete pelvic girdle is formed ?  
 (a) Two Ilium (b) Ischium (c) Two Coxal bone (d) Acetabulum
61. What is incorporated in pelvic girdle ?  
 (a) Ilium, Ischium, pubis (b) Ilium, Ischium, Clavicle  
 (c) Ilium, Ischium, Scapula (d) Humerus, Clavicle, scapula

62. Which bone is occurs in Shank ?  
 (a) Radio-Ulna                      (b) Tibio-fibula                      (c) Humerus                      (d) Femur
63. What is the number of cervical vertebrae in human ?  
 (a) 4                      (b) 7                      (c) 9                      (d) 14
64. The number of tarsals in each limb of human ?  
 (a) 5                      (b) 6                      (c) 7                      (d) 8
65. By the help of what amoeboid movement is possible ?  
 (a) Flagellary                      (b) leg                      (c) Cilia                      (d) Pseudopodia
66. Which movement is seen in Paramoecium ?  
 (a) Flagella's                      (b) Amoeboid                      (c) Ciliary                      (d) Pseudopodia
67. Through what the movement of internal organs of body occur ?  
 (a) Skeleton muscles                      (b) Voluntary muscles  
 (c) Non-striated muscles                      (d) All type of muscles
68. It is type of non-striated muscles ?  
 (a) Voluntary muscles      (b) Skeleton muscles      (c) Involuntary muscles      (d) None of the given
69. Which is the functional unit of voluntary muscles ?  
 (a) H-band                      (b) A-band                      (c) I-band                      (d) Sarcomere
70. Where cardiac muscle is present ?  
 (a) In all internal Organs                      (b) In lungs  
 (c) In heart                      (d) In hand
71. How many vertebrae are in found adult human ?  
 (a) 33                      (b) 28                      (c) 24                      (d) 26
72. Which are the three type of muscle found in human ?  
 (a) Voluntary muscle, Involuntary muscle and circular muscle  
 (b) Striated muscle, Non-striated muscle and Voluntary muscle  
 (c) Involuntary muscle, Autonomous muscle and Transverse muscle  
 (d) Skeleton muscle, Visceral muscle, And cardiac muscle
73. Which of the following is not true ?  
 (a) Cilia – Paramoecium                      (b) Tentacles – Hydra  
 (c) Pseudopodia – Amoeba                      (d) Flagella – Hydra
74. Which of the following pair is improper ?  
 (a) A-band, I- band – Striated muscle  
 (b) A-band, I- band Intercalated disc – Striated muscle  
 (c) H- line – Nonstriated muscle  
 (d) Z- line – Striated muscle
75. Which of the following pair is improper ?  
 (a) Axial skeleton – 80 bones                      (b) Cranium — 8 bones  
 (c) Vertebral column – 26 vertebrae                      (d) Ribs – 22 pairs

76. Make correct pairs from the column - I and column - II.

**Column I**

- (P) Cervical vertebrae  
 (Q) Thoracic vertebrae  
 (R) Lumbar vertebrae  
 (S) Sacrum vertebrae  
 (T) Coccygeal vertebrae  
 (a) (P-ii) ( Q -iv ) ( R- ii) ( S - v) ( T - i)  
 (c) ( P-iii) ( Q -iv) ( R- ii) ( S - v) ( T - i)

**Column - II**

- (i) 4  
 (ii) 5  
 (iii) 7  
 (iv) 12  
 (iv) 5  
 (b) ( P-ii) ( Q -iii) ( R- i) ( S - v) (T - iv)  
 (d) ( P-v) ( Q -iii) (R- ii) ( S - i) ( T - iv)

77. Make proper pairs.

**Column - I**

- (P) Red muscle  
 (Q) White muscle  
 (R) Immoveable joint  
 (S) Synovial joint  
 (a) ( P-iv ) (Q -iii) (R- i) ( S - ii)  
 (c) (P-iii) (Q-iv) (R-i)(S-ii) pectoral girdle

**Column - II**

- (i) Muscle of eye ball  
 (ii) Flight muscle of bird  
 (iii) In-between humerus and  
 (iv) Bones of skull  
 (b) ( P-ii) ( Q -i) (R- iiv) (S - iii)  
 (d) ( P-ii) ( Q -i) (R- iv ) ( S - iii)

78. Make correct pairs from the column -I and column - II.

**Column - I**

- (P) Skull bone  
 (Q) Vertebral column  
 (R) Carpals  
 (S) Axis  
 (T) Clavicle  
 (a) ( P-ii) ( Q -iv ) ( R- ii) ( S - v) ( T - i)  
 (c) ( P-iii) ( Q -v) ( R- iv ) ( S - ii) (T- i)

**Column - II**

- (i) Two curves  
 (ii) Second vertebrae  
 (iii) 22  
 (iv) 08  
 (iv) four curves  
 (b) ( P-ii) ( Q -iii) ( R- i) ( S - v) (T - iv)  
 (d) (P-v)(Q-iii) ( R-ii) (S-i)(T-iv)

79. Make proper pairs.

**Column - I**

- (P) F- actin  
 (Q) Ethmoid  
 (R) ATPase  
 (S) Lacrymal bone  
 (a) ( P-iv ) ( Q -iii) (R- i) ( S - ii)  
 (c) ( P-iii) ( Q -iv) (R- ii) ( S - i)

**Column - II**

- (i) Facial bone  
 (ii) Myosin  
 (iii) Polymerize protein  
 (iv) Bones of skull  
 (b) ( P-ii) ( Q -i) ( R- iiv) ( S - iii)  
 (d) ( P-ii) ( Q -i) (R- iv ) ( S - iii)

80. Which is the smallest bone of fore limb ?

(CPMT- 2002)

- (a) Humerus                      (b) Femur                      (c) carpals                      (d) Fibula

81. In which bone triangular acromion is present ?

(CPMT- 2002)

- (a) Radias                      (b) Scapula                      (c) Femur                      (d) Humerus

82. Humerus bone is found : (DPMT- 1985)  
 (a) Radius (b) Ulna (c) arm (d) Fore arm
83. Hinge joint occurs between : (CPC - 2003 )  
 (a) Humerus and radio-ulna (b) Femur and pelvic girdle  
 (c) Humerus and Pectoral girdle (d) Skull and atlas
84. Total numbers of vertebrae in human skeleton. (JIMERT 2002)  
 (a) 30 (b) 32 (c) 33 (d) 35
85. Number of bones present in an arm is : (AFMC - 2004 )  
 (a) 30 (b) 32 (c) 35 (d) 40
86. Ribs are attached to : (Wardha- 2001 )  
 (a) Scapula (b) Sternum (c) Clavicle (d) Ilium
87. In humans, coccyx is formed by the fusion of vertebrae (NCERT- 1978)  
 (a) 3 (b) 4 (c) 5 (d) 6
88. What is formed by the bones of pectoral girdle, pelvic girdle and limbs ? (CPMT- 1987)  
 (a) Body skeleton (b) External skeleton  
 (c) Axial skeleton (d) Appendicular skeleton
89. Number of floating ribs in human body is : (JIMERT- 2000)  
 (a) 6 pairs (b) 5 pairs (c) 3 pairs (d) 2 pairs
90. Ankle joint is : (Pb.P.M.T- 1997)  
 (a) Pivot joint (b) Ball and socket joint (c) Hinge joint (d) Gliding joint
91. Sarcomere is distance between : ( BHU-2001, CBSE- 2004, RPMT- 2002)  
 (a) Two I- bands (b) A and I bands (c) Two consecutive Z- lines (d) Z and A bands
92. Which is the skull bone ? (CBSE- 1998)  
 (a) Atlas (b) Femur (c) Tibia (d) Nasal
93. How many bones are there in appendicular skeleton ? (BV - 2003)  
 (a) 80 (b) 120 (c) 126 (d) 206
94. Where is hinge joint found ? (APMEE- 2002)  
 (a) Elbow and shoulders (b) Elbow and Knee  
 (c) Atlas and odontoid process (d) Knee and ankle
95. Number of ball and socket joints present in human body is : (Wardha- 2003)  
 (a) 2 (b) 4 (c) 5 (d) 8
96. Synovial joints is : (Orrisa - 2004)  
 (a) Ball and socket joint (b) Pivot joint  
 (c) Hinge joint (d) All the above
97. Give the number of Cranium bones ? (JKCMEE - 2005)  
 (a) 8 (b) 10 (c) 14 (d) 20
98. Cervical vertebrae are located in : (HPPMT - 2005)  
 (a) Thoracic region (b) Abdominal region (c) Neck region (d) Hip region

99. Lumbar vertebrae are located in : (HPPMT - 2005)  
 (a) region (b) Thorax  
 (c) Abdominal region (d) Hip region
100. Ratio of which is more in red muscle ? (JIMER -2002)  
 (a) Myoglobin (b) Actin (c) Myosin (d) Albumin
101. Friction is lessened in ball and socket joint by (MPPMT -1990)  
 (a) Coelomic fluid (b) Synovial fluid  
 (c) Pericardial fluid (d) Mucin
102. Each half of pelvic girdle is made of (MPPMT -1998)  
 (a) Ischium (b) Ilium (c) Pubis (d) All the above
103. Extremities of long bones possess cartilage (C.B.S.E. 2002)  
 (a) Calcified (b) Fibrous (c) Elastic (d) Hyaline
104. Glenoid cavity is found in (A.M.U. - 2000)  
 (a) Pelvic girdle (b) Skull (c) Pectoral girdle (d) Sternum
105. An example of gliding joints is (MPPMT -1992)  
 (a) Humerus and glenoid cavity (b) Femur and tibio-fibula  
 (c) Occipital condyle and odontoid process (d) Zygapophyses of adjacent vertebrae.
106. During muscle contraction (C.B.S.E. - 2001)  
 (a) Size of a-bands remains the same (b) Size of H-zone becomes smaller  
 (c) Size of I-bands decreases (d) All the above
107. Substance that accumulates in a fatigued muscle is (Har.P.M.T. - 2003)  
 (a) Pyruvic acid (b) Lactic acid (c) CO<sub>2</sub> (d) ADP
108. What is the phenomenon of overstretched or torn ligaments and tendon called  
 (a) Sprain (b) Dislocation (c) Fracture (d) Tension
109. Which ion is essential for muscle contraction ? (Pb. PMT - 2000)  
 (a) Na (b) K (c) Ca (d) Cl
110. Ends of long bones are covered by (Bhi.P.M.T-2001)  
 (a) Ligaments (b) Cartilage (c) Muscles (d) Blood cells
111. Acromion process is part of (B.V. 2003)  
 (a) Vertebral column (b) Pelvic girdle (c) Femur (d) Pectoral girdle
112. In mammals the lower jaw is made of (Kerala -2000)  
 (a) Maxilla (b) Dentary (c) Mandible (d) Ethmoid
113. Inter-articular disc occurs in (B.H.U. -1997)  
 (a) Wall of heart (b) Wall of liver  
 (c) Pubic symphysis (d) In between two vertebrae
114. Acetabulum is part of (C.E.T. chd. 2000)  
 (a) Pelvic girdle (b) Pectoral girdle (c) Fore arm (d) Upper arm

115. The function unit of contractile system of a striated muscles is (C.M.E.E.-2004)  
 (a) Sarcomere (b) Z-band (c) Cross bridge (d) Myofibril
116. Fibrous joints are present between (M.P.P.M.T. -2000)  
 (a) Thumb and metatarsal (b) Humerus and radio-ulna  
 (c) Bonus of skull (d) Glenoid cavity and pectoral girdle
117. Joint of sternum and ribs is (C.B.S.E. -2000)  
 (a) Cartiginous (b) Fibrous joint (c) Angular joint (d) Hinge joint
118. During & vigorous exercise, glucose is converted into (C.P.M.T.- 2000)  
 (a) Glycogen (b) pyruvic acid (c) Starch (d) Lactic acid
119. Synovial fluid is present in (Har. P.M.T. - 2000)  
 (a) Spinal cavity (b) Cranial cavity  
 (c) Freely movable joints (d) Fixed joints
120. Synovial fluid is secreted by (B.V.-2001)  
 (a) Blood (b) Cartilage  
 (c) Bone (d) Synovial membrane
121. Iliac of pelvic girdle is articulated with sacrum for (B.V.-2001)  
 (a) Bending (b) Jumping (c) Support (d) Running
122. Anisotropic band are made up of (A.M.U.- 2001)  
 (a) Myosin filaments (b) Actin filaments (c) Elastin filaments (d) Both A and B
123. Socket in pelvic girdle in which head of femur articulates is formed by fusion of (uttaranchal - 2001)  
 (a) Ischium and pubis (b) Ilium and pubis (c) Ilium and ischium (d) Both a and b
124. The movable skull bone is (Wardha-2002)  
 (a) Maxilla (b) Vomer (c) Mandible (d) All the above
125. Gliding joint occur between (B.V. - 2002)  
 (a) Prezygapophysis and postzygapophysis (b) Acetabulum and femur  
 (c) Pelvis girdle and femur (d) Humerus and radius.
126. Red muscle are rich in (J.I.P.M.E.R.-2002)  
 (a) Golgi bodies (b) Mitochondria (c) Lysomomes (d) Ribosomes.
127. Joint between atlas and axis is (A.F.M.C. - 2003)  
 (a) Pivot (b) Hinge (c) Angular (d) Saddle
128. The longest bone amongst the following is (B.V - 2003)  
 (a) Radius (b) ulna (c) Humerus (d) Femur
129. Joint between metacarpals and phalanges is (B.V - 2003)  
 (a) Ball and socket (b) Pivot (c) Saddle (d) Hinge
130. ATP-ase needed for muscle contraction is present over (C.B.S.E.-2004)  
 (a) Actin (b) Troponin (c) Myosin (d) Actin

131. Make correct pairs from the column - I and column - II. (OrrisaJEE - 2010)

Column - I

Types of synovial joint

(P) Ball and socket

(Q) Hinge

(R) Pivot

(S) Saddle

Column - II

Bones involved

(i) Carpal and metacarpal of thumb

(ii) Atlas and axis

(iii) Frontal and parietal

(iv) Knee

(v) Humerus and pectoral girdle

(a) ( P-ii) (Q-iv) (R-ii)(S-v)

(b) ( P-ii) (Q -iii) ( R- i) (S - v)

(c) (P-iii)(Q-v) (R-iv)(S-ii)

(d) (P-v) (Q -iv) ( R- ii) (S - i)

132. Major protein in the thick filament of skeletal muscle fibre is (MP PMT 2011)

(a) Tropomyosin

(b) Myosin

(c) Actin

(d) Troponin

133. True joints are (Wardha 2005)

(a) Synchondroses

(b) Syndesmoses

(c) Synovial

(d) Ball and socket

\* Question number 134 to 144 are A and R type question option for question number 134 to 144

**a. Both A and R are true and R is correct explanation of A**

**b. Both A and R are true but R is not correct explanation of A**

**c. A is true but R is false**

**d. A is false but R is true**

134. Statement (A) : Organisms change their habitat or place.

Reason (R) : Autonomous movement like running, walking, swimming etc. are called locomotion.

(a)

(b)

(c)

(d)

135. Statement (A) : Pseudopodia of Amoeba is helpful in food capturing and for changing place.

Reason (R) : In Amoeba movement is occurred by the effect of pseudopod. Which produces through flow of protoplasm.

(a)

(b)

(c)

(d)

136. Statement (A) : In skeleton muscle horizontal belts are arranged in line.

Reason (R) : Skeleton muscle is also called striated muscle.

(a)

(b)

(c)

(d)

137. Reason (R) : Non-striated muscles are innervated by autonomous nervous system.

Statement (A) : Non-striated muscle is also called involuntary muscle.

(a)

(b)

(c)

(d)

138. Statement (A) : The contraction of cardiac muscle is Quick, rhythmic, powerful and never get fatigue

Reason (R) : Intercalated disc is absent in cardiac muscle.

(a)

(b)

(c)

(d)

139. Reason (R) : Sarcomere reduce in length during muscle contraction.

Statement (A) : During muscle contraction protein of I-band slides over A-band.

(a)

(b)

(c)

(d)

140. Statement (A) : Human skeleton is made of by 206 bones  
Reason (R) : Human skeleton system is divided into axial skeleton and appendicular skeleton.  
(a) (b) (c) (d)
141. Statement (A) : In human 12 pairs of ribs are present.  
Reason (R) : The ribs have two articulation surfaces it is called bicephalic.  
(a) (b) (c) (d)
142. Statement (A) : Thoracic vertebrae, ribs and sternum makes a ribcage.  
Reason (R) : The ribcage protects heart, large blood vessels and lungs.  
(a) (b) (c) (d)
143. Statement (a) : The anterior region go glenoid cavity and humerus joint form joint of shoulder.  
Reason (R) : The joint of shoulder is ball and socket joint.  
(a) (b) (c) (d)
144. Statement (a) : The joints of skull are immovable.  
Reason (R) : The bones of skull are joint with each other by strong collagen fibres.  
(a) (b) (c) (d)



**ANSWER KEY**

1	d	41	b	81	c	121	a
2	d	42	a	82	c	122	d
3	a	43	a	83	a	123	c
4	d	44	a	84	c	124	d
5	d	45	a	85	a	125	d
6	d	46	c	86	b	126	b
7	d	47	a	87	b	127	a
8	d	48	a	88	d	128	d
9	d	49	a	89	d	129	d
10	b	50	a	90	d	130	c
11	a	51	a	91	c	131	d
12	d	52	a	92	d	132	c
13	c	53	a	93	c	133	a
14	d	54	a	94	b	134	a
15	a	55	a	95	b	135	b
16	d	56	b	96	d	136	a
17	d	57	a	97	a	137	c
18	d	58	a	98	c	138	c
19	d	59	c	99	c	139	b
20	d	60	c	100	a	140	b
21	a	61	d	101	b	141	b
22	b	62	b	102	d	142	a
23	d	63	b	103	d	143	a
24	b	64	c	104	c	144	a
25	b	65	d	105	b		
26	c	66	c	106	d		
27	d	67	c	107	b		
28	a	68	c	108	c		
29	a	69	d	109	c		
30	b	70	c	110	b		
31	b	71	d	111	d		
32	a	72	d	112	c		
33	d	73	d	113	d		
34	a	74	c	114	a		
35	a	75	d	115	a		
36	c	76	c	116	c		
37	b	77	b	117	a		
38	a	78	c	118	d		
39	d	79	c	119	c		
40	d	80	a	120	d		

## Unit :- V

## Chapter-24. Neural Control and Coordination in Animals

### IMPORTANT POINTS

Nervous system has evolved to maintain coordination and integration amongst different tissue, organs and system of body. So that body can work as one complete and an efficient unit. During course of evolution, it has undergone many changes from simplest to the most complex. In all these forms neuron has remained structural and functional unit of the nervous system.

Neurons are consist of cyton (cell body) and processes. They are divided into three main types: unipolar, bipolar and multipolar.

The neuron remain freely scattered under body wall and are interconnected to make simplest and very first evolved nervous system in coelentrata (e.g Hydra), With increase in complexity and body organization (tissue, organ and organ system). It has developed in to a better and an effective structure. like ganglion and nerves (flat worms) ganglionated with nerve cord (Arthropoda, Annelida, Mollusca) and highly complex structures like brain, spinal cord (vertebrata).

Nervous system of human is divided in to CNS and PNS. CNS is comprised of brain and spinal cord, Cranial nerves, spinal nerves [somatic section] and sympathetic and para-sympathetic nervous system [autonomic nervous system] makes PNS. CNS and PNS are covered by three meninges, Dura mater, Arachnoid and Pia mater. Nervous system consist of two type of tissues white matter (myelinated nerve fibre and neurons with long processes) and grey matter (non-myelinated fibres and neurons with short processes). Brain is divided in to fore brain, mid-brain and hind brain, Fore brain consist of cerebrum, diencephalon (thalamus and hypothalamus) Corpus callosum and associated area are important regions of cerebrum. Association area of brain are linked with intersensory neuron association, memory and Communication. Limbic system is present in fore brain which include amygdala and hippocampus. Limbic system and hypothalamus together regulate sexual behaviour and emotional expressions.

Mid brain consist of corpora quadrigemina, which are concerned with vision and hearing.

Hind brain consist of three region Pons, Cerebellum and medulla oblongata.

Mid brain and hind brain together form brain stem Spinal cord is second major component which controls both voluntary and involuntary functions. Reflexes are regulated mainly by spinal cord, they are spontaneous and not under the control of will.

Autonomic (Autonomous) nervous system is divided in to two major section; Sympathetic and Parasympathetic nervous system. Both are complementary to each other and helps in normalizing body functions. they regulate function of various organs as under.

- |                       |   |
|-----------------------|---|
| (i) Iris              | (Sympathetic) – expand it. (Parasymp) – contract it.                    |
| (ii) Alimentary Canal | (Sympathetic) – Slow down peristalsis (Parasymp) – Speed up peristalsis |
| (iii) Blood Pressure  | (Sympathetic) – Increases (Parasymp) – decreases                        |
| (iv) Hair             | (Sympathetic) – Erect (Parasymp) – Normal/ oblique                      |
| (v) Urinary bladder   | (Sympathetic) – Relaxation (Parasymp) – Contraction.                    |
| (vi) Sweat Gland      | (Sympathetic) – Increases activity (Parasymp) – Decreases activity      |

## Questionbank Biology

Nerves of the PNS are divided into sensory, motor and mixed 12 pairs of nerves arising from brain are called cranial nerves. Some these are sensory, some are motor and some of these are mixed nerves cranial nerver are classified on the basis of that number, name, types, orgin, target, organs and function as under.

Number	I
Name	Olfactory
Type	Sensory
Origin	Olfactory lobe
Target Organ	Olfactory epithelium
Function	Carry impulse of smell
Number	II
Name	Optic
Type	Sensory
Origin	Diencephalon
Target Organ	Retina
Function	carry impulse of vision
Number	III
Name	Oculomotor
Type	Motor
Origin	Mid- Brain
Target Organ	Eye muscles (Inferior oblique, Inferior rectus, Superior rectus and median rectus) Pupil, Ciliary muscle.
Function	Movement of eye, Activity of pupil and Ciliary muscle
Number	IV
Name	Trochlear
Type	Motor
Origin	Mid- Brain
Target Organ	Eye muscles (Superiore oblique)
Function	Movement of eye ball
Number	V
Name	Trigeminal (Has three Branches) 1 Ophthalmic(Sensory) 2 Maxillary(Sensory) 3 Manibular(Mixed)
Type	Mix
Origin	Pons
Target Organ	Of Ophthalmic = Skin of forehead, Upper eyelids Of Maxillary = Upper Jaw, upper lips, cheeks , Of Mandibular = Lower Jaw Muscles, Tongue, Lower Jaw Skin Lower Lip.
Function	Of Ophthalmic and Maxillary are Tactile Of Mandibular is movement of tongue and jaw
Number	VI
Name	Abducens

Questionbank Biology

Type	Sensory	Motor
Origin		Pons
Target Organ		Lateral rectus muscles of eye
Function		Movement of eye muscle
Number		VII
Name		Facial
Type		Mixed(has two branches)
Origin		Pons
Target Organ		Face muscles, Neck muscles, Salivary glands, Lacrimal glands, Taste buds
Function		Movement of face muscles, secretion of lacrimal Gland and salivary glands.
Number		VIII
Name		Auditory
Type	Sensory	Sensory
Origin		pons
Target Organ		Vestibule and Cochlea
Function		Equilibrium and to carry auditory impulse.
Number		IX
Name		Glosso-pharangeal
Type	Sensory	Mixed
Origin		Side of medulla oblongata
Target Organ		Posterior region of tongue, Pharynx muscle, parotid glands
Function		Movement of tongue and pharynx muscles
Number		IX
Name		Glosso- pharangeal
Type	Sensory	Mixed
Origin		Side of medulla oblongata
Target Organ		Posterior region of tongue, Pharynx muscle, parotid glands
Function		Movement of tongue and pharynx muscles
Number		IX
Name		Vagus Pneumo-gastric
Type	Sensory	Mixed
Origin		Side of medulla oblongata
Target Organ		Larynx, Heart, Blod-vessls, Oesophagus, stomach, ntestine, Lungs etc.
Function		Movement of all target organ
Number		XI
Name		Spinal accessory
Type	Sensory	Motor
Origin		Side of medulla oblongata
Target Organ		Muscles of Neck and shoulder
Function		Movement of neck and shoulder muscles And relaxation of visceral organs

Number	XII
Name	Hypo-Glossal
Type	Sensory Motor
Origin	Side of medulla oblongata
Target Organ	Tongue
Function	Movement of tongue

31 pairs of spinal nerves are arising from spinal cord. All these are mixed nerves.

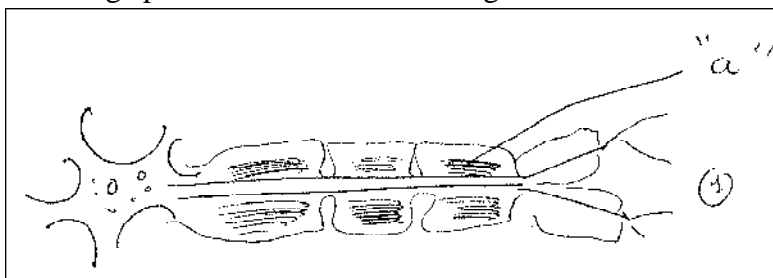
Sense organs enable us to receive and realize external as well as internal stimuli. Sense organs of human are of two types; in terms of their sensory cells, some are with very specialized structure, in which the sensitive sensory cells are localized (e.g. eye, ear, taste bud, olfactory epithelium). In some special structure. The other are general sense organs, cells of which are not present in specialized structures, but scattered under skin or in the wall of some organs.

In human a pair of eyes are located in deep sockets called orbit, in front side of the head. Human eyes possess eye-lids, eye-lashes. The structure of eye has three distinct regions; sclera, choroid and retina. Retina of eye possesses photo receptor cells like rod cells and cone cells, cone cells are photopic and rod cells are scotopic in nature.

Ear is sound sensory organ and also maintains balance. In human (mammals) it has three distinct regions. External ear (outer ear); middle ear and internal ear. External ear has ear pinna and auditory canal. Tympanic membrane and ear-ossicles (malleus, incus and stapes) are the regions of middle ear. Internal ear has two labyrinths; bony and membranous.

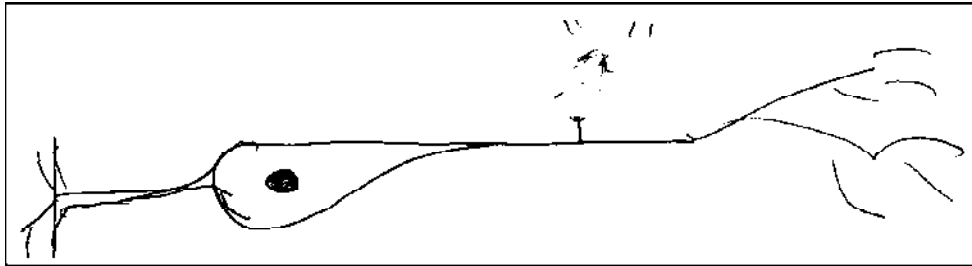
Perilymph surrounds membranous labyrinth on its outer side, whereas endolymph is present in lumen (cavity) of membranous labyrinth. Cochlea is main auditory organ in internal ear. The organ of Corti is present on basilar membrane of cochlear canal. It has sound sensory cells. It is main sound sensory organ.

1. Which of the following options is not correct for the region labelled as "a" in the given diagram.



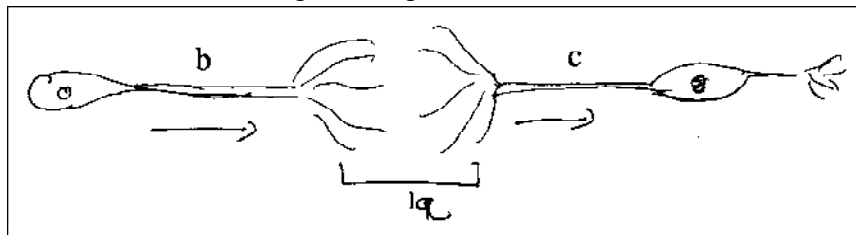
- (a) White and fatty compound  
 (b) It is conductive  
 (c) Region without it called node of Ranvier  
 (d) It is responsible for saltatory conduction
2. Which of the given options is correct for autonomous nervous system?
- (a) In it medullary sheath is very well developed  
 (b) Node of Ranvier is present in it.  
 (c) It is part of CNS  
 (d) Its nerve do not travel for longer distance in body

3. What does given diagram show ? where is it found ?



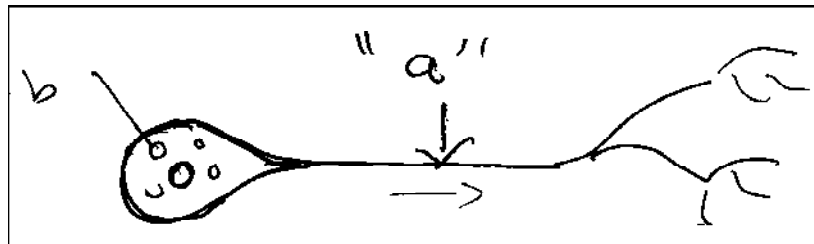
- (a) Unipolarneuron in spinal cord                      (b) Bipolar neuron ; in eye of human  
 (c) Unipolar neuron; In embryonic stage            (d) Unipolar neuron in eye of human

4. What does a and b indicate in the given diagram ?



- (a) Synaptic cleft    (b) Synase between axon  
 (c) Synapse between axon and dendron            (d) Synapse - between two dendrite

5. What dose "a" and "b" indicate in the given diagram ?



- (a) a = Dendrite;                      b = Nissl's granules                      (b) a = Axon fibres ;                      b = Nucleus  
 (c) a = Axon fibres ;                      b = Mitochondria                      (d) None of the given

6. What does "b" and "c" indicate in the given diagram in question no 4?

- (a) b = Synapse;                      c = dendrites                      (b) c = Synapse;                      c = Axon fibres  
 (c) b = axon                      c = dendrit                      (d) b = Synaptic bulb;                      c = Motor nerve

7. What is correct in context with neuron ?

- (a) Nissl's granule present in it are acidic  
 (b) It's cytoplam is restricted to only cyton  
 (c) Each neuron has one axon and one dendron  
 (d) Cyton possesses large nucleus

8. In which animal nervous system is in the form of nerve-net ?

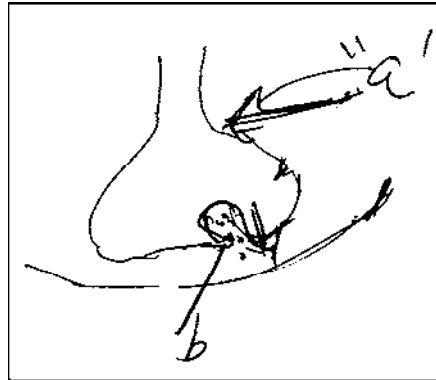
- (a) Leucosolania                      (b) Liver-Fluke                      (c) Planaria                      (d) Hydra

9. In which animal neverous system consist of brain, ganglion and nerve fiber ?

- (a) Tape-worm                      (b) Liver-Fluke                      (c) Ascaris                      (d) Allof the given

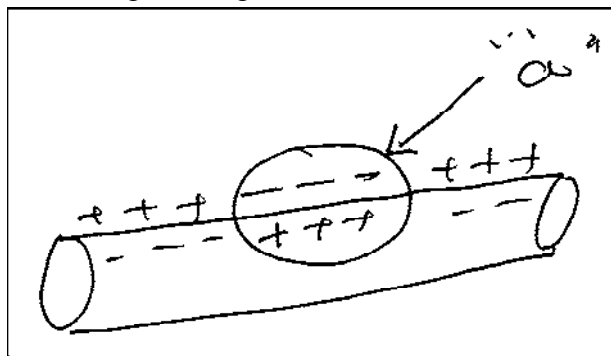
10. which option shows correctly matched pairs for the column I and Column II ?
- | Column-I              | Column-II                |
|-----------------------|--------------------------|
| (P) Unipolar neuron   | (i) Retina               |
| (Q) Bipolar neuron    | (ii) Cerebral hemisphere |
| (R) Multipolar neuron | (iii) Embryonic stage    |
- (a) (P-iii), (Q-i), (R-ii)                      (b) (P-ii), (Q-i), (R-iii)  
 (c) (P-iii), (Q-ii), (R-i)                      (d) (P-ii), (Q-iii), (R-ii)
11. What type of process the transmission of nerve impulse is ?
- (a) Electromagnetic      (b) Electro-chemical  
 (c) only Electrical      (d) only Magnetic
12. What is correct for the resting potential
- (a) On inner side of plasma membrane +ve charge & outside -ve charge is found  
 (b) On outside  $\text{Na}^+$  concentration is less, on inner side  $\text{K}^+$  concentration is less  
 (c) On outside a plasma membrane +ve charge and inner side is -ve charge  
 (d) Electrically it is neutral in resting stage.
13. That is correct for unstimulated nerve-fibre ?
- (a) Resting potential      (b) Action potential      (c) Repolarization      (d) Depolarization
14. Which option is correct for ion channel ?
- (a) They consist of lipid.                      (b) They always remain open.  
 (c) They are permeable to more than one ion      (d) They consist of protein
15. Which option indicates correct chronology of the changes occurring during transmission of nerve impulse ?
- (a) Nerve fibre - depolarization - action potential - repolarization - activation of  $\text{Na}^+$  and  $\text{K}^+$  pump  
 (b) Nerve fibre - depolarization - action potential - activation of  $\text{Na}^+$  and  $\text{K}^+$  pump - repolarization  
 (c) Nerve fiber - depolarization - repolarization - action potential - activation of  $\text{Na}^+$  and  $\text{K}^+$  pump  
 (d) Nerve fiber - Activation of  $\text{Na}^+$  and  $\text{K}^+$  pump - depolarization - repolarization -
16. Which of the following is used to measure membrane potential ?
- (a) Sphygmomanometer                      (b) Thermometer  
 (c) Voltmeter                      (d) Galvanometer
17. What is responsible for the opening and closing of ion-channel ?
- (a) Electrical changes & Chemical Changes  
 (b) More  $\text{Na}^+$  Conc out side of plasma membrane  
 (c) More  $\text{K}^+$  Conc inner side of plasma membrane  
 (d) On both Side of membranes  $\text{Na}^+$  and  $\text{K}^+$  are in equal proportion

18. What does "a" and "b" indicate in the given diagram ?



- (A) a = Synaptic bulb b = Phagocytosis
- (B) a = Presynaptic b = Phagocytosis
- (C) a = Synaptic gap b = Secretion of neurotransmitter
- (D) a = Presynaptic bulb b = Secretion neurotransmitter

19. What does "a" indicate in the given diagram



- (a) Repolarization
- (b) Depolarization
- (c) Resting potential
- (d) Activation of  $\text{Na}^+$  and  $\text{K}^+$  pump

20. In context with conduction of nerve impulse, what is the function of ion channels ?

- (a) Maintenance and change in electric potential
- (b) Transport of ions against diffusion gradient
- (c) Transport of  $\text{Na}^+$  ion to the innerside of a the membrane
- (d) All of the given

21. When sodium and potassium pump is activated, for (a)  $\text{Na}^+$  ion, (b)  $\text{K}^+$  ion are exchanged ?

- (A) a = one , b= two
- (B) a = two, b= four
- (C) a = two , b= three
- (D) a = one, b= three

22. The transfer of ion through ion channel is (a) and (b)

- (a) a= Bidirectional, b= selectively permeable
- (b) a=Unidirectional, b= permeable



- (c) a = Bidirectional, b = semi permeable  
 (d) a = Unidirectional, b = selectively permeable
23. What is the swollen, structure present at terminal end of each branch of nerve cell called ?  
 (a) Synaptic cleft  
 (b) synaptic vesicle  
 (c) synapse  
 (d) synaptic knob
24. Which option is correct for the correctly matched groups for the column i; column ii and column
- | <b>Column I</b>                | <b>Column II</b>   | <b>Column III</b>   |
|--------------------------------|--|---|
| (a) Resting membrane potential | (i) Na <sup>+</sup> Channel get open                           | (e) Na <sup>+</sup> and K <sup>+</sup> pumps are responsible for it |
| (b) Active potential           | (ii) Na <sup>+</sup> Channel is closed                         | (f) Last for very short time  |
| (c) Depolarization             | (iii) Na <sup>+</sup> ions are more on outer side of membranes | (g) K <sup>+</sup> ions move on outside                             |
| (d) Repolarization             | (iv) K <sup>+</sup> ions are more on outer side of membrane    | (h) Positive charge of inner side of membrane                       |
- (A) (a-iv-f) (b-iii-e) (c-ii-h) (d-i-g)      (B) (a-iv-e) (b-iii-f) (c-ii-g) (d-i-h)  
 (C) (a-iii-e) (b-iv-f) (c-i-h) (d-ii-g)      (D) (a-ii-h) (b-i-g) (c-iii-e) (d-iv-f)
25. Which of the following generally transmit nerve impulse only to the cyton ?  
 (a) Axon                      (b) Dendrite                      (c) Synaptic knob                      (d) Node of Ranvier
26. What is correct in reference with nerve impulse ?  
 (a) Self-induced and unidirectional  
 (b) Self-induced and bidirectional  
 (c) Electric potential in the nerve by region increase  
 (d) Ion channel get closed in this region.
27. \_\_\_\_\_ is wrapped by cerebrum ?  
 (a) Thalamus                      (b) Hypothalamus  
 (c) Cerebellar hemisphere                      (d) Mid-brain
28. The weight of human brain is [a] and [b] neuron in it.  
 (a) a = 1000 to 1100g                      (b) a = 1200 to 1400g  
     b = 1000 billion                      b = 100 billion  
 (c) a = 800 to 1000g                      (d) a = 1200 to 1400g  
     b = 1000 million                      b = 100 million
29. Which of the following is a thin transparent nonvascular meninges around CNS ?  
 (a) Dura mater                      (b) Pia mater                      (c) Arachnoid                      (d) Grey matter
30. Which of the following option indicates correct chronology of the meninges from cranium to CNS ?  
 (a) Dura mater → Arachnoid → Pia mater                      (b) Pia mater → Arachnoid → Dura mater  
 (c) Pia mater → Dura mater → Arachnoid                      (d) Arachnoid → Dura mater → Pia mater

31. Which of the following option is the correct option for the inner most meninges of CNS ?  
 (A) very Thick and tough (B) Thin and vascularized  
 (C) Highly vascularized (D) Thin non vascularized
32. Which of the following is toughest ?  
 (A) Piamater (B) Arachnoid (C) Dura mater (D) None of the given
33. Which of the following is adherent to brain ?  
 (A) Arachnoid (B) Pia mater (C) Dura mater (D) None of the given
34. Which of the following does not have lumen ?  
 (A) cerebrum (B) cerebellar hemisphere  
 (D) Diencephalon (D) Medulla
35. Which of the following is not related to fore brain ?  
 (A) lateral ventricle (B) Inferior Collicule  
 (C) Corpus callosum (D) Voluntary locomotion
36. Which of the following have major co-ordinating centres for sensory and motor signal  
 (A) Brain stem (B) Pons (C) mid brain (D) Thalamus
37. It has centres to regulate body temperature ?  
 (A) Thalamus (B) Hypothalamus  
 (C) Corpora quadrigemina (D) Pons
38. [a] and [b] are the regions of Limbic system  
 (A) a = Thalamus b = Hypothalamus  
 (B) a = Amygdala b = thalamus  
 (C) a = Hippocampus b = Hypothalamus  
 (D) a = Amygdala b = Hippocampus
39. Limbic system along with \_\_\_\_\_ regulates sexual behaviour ?  
 (A) Hypothalamus (B) Thalamus (C) Cerebral cortex (D) cerebrum
40. Mid brain is located between [a] and [b] ?  
 (A) a = cerebral hemisphere (B) a = Hypothalamas  
 b = Diencephalan b = midbrain  
 (C) a = Pons (D) a = Diencephalon  
 b = Medulla oblongata b = Pons
41. Which option show correctly matched pairs for the column I and column II ?
- | column I              | column II   |
|-----------------------|---|
| (P) cerebrum          | (i) 3 <sup>rd</sup> ventricle   |
| (Q) Diencephalon      | (ii) connect 3 <sup>rd</sup> ventricle with 4 <sup>th</sup> ventricle                     |
| (R) Medulla oblongata | (iii) 4 <sup>th</sup> ventricle   |
| (S) Iter              | (iv) 1 <sup>st</sup> and 2 <sup>nd</sup> ventricle  |
| (T) Forman of Manro   | (v) connects 1 <sup>st</sup> and 2 <sup>nd</sup> ventricle with 3 <sup>rd</sup> ventricle |

Questionbank Biology

- (A) (P - ii), (Q - i), (R - iv), (S - iii), (T - v)      (B) (P - iii), (Q - i), (R - iv), (S - ii), (T - v)  
 (C) (P - iv), (Q - i), (R - iii), (S - v), (T - ii)      (D) None of the given
42. Cerebral aqueduct passes through [a] and it opens into [b] ?  
 (A) a = mid brain      (B) a = Diencephalon  
     b = 4<sup>th</sup> ventricle      b = 3<sup>rd</sup> ventricle  
 (C) a = Medulla Oblongata      (D) a = cerebrum  
     b = 4<sup>th</sup> ventricle      b = Diencephalon
43. On which side of the brain corpora quadrigemina is present ?  
 (A) Dorsal      (B) Ventral      (C) Lateral      (D) ventro lateral
44. What is the function of superior colliculi of mid brain ?  
 (A) To control emotional reflex      (B) To control Auditory reflex  
 (C) To control visual reflex      (D) To control Audio visual reflex
45. What is posterior choroid plexus ?  
 (A) Non nervous epithelial folded roof      (B) Non-nervous epithelial floor  
 (C) Nervous, epithelial folded roof      (D) Nervous, epithelial folded floor
46. Spot the odd ( in terms of type of reflex)  
 (A) Secretion of saliva on seeing tasty food      (B) Antiperistalsis  
 (C) Peristalsis      (D) Heart - beat
47. Several examples of reflexes are given here, which of the given option indicates all correct examples of Conditioned reflex ?  
 Examples  
 (i) Prejudices      (ii) Heart - beat      (iii) Peristalsis      (iv) dis-liking  
 (v) Habits  
 (A) (i), (ii), (iii)      (B) (i), (iii)      (C) (i), (iv) and (v)      (D) (i) and (iii)
48. Which layer of an eye is transparent and thin  
 (A) Outer sclera      (B) middle - sclera      (C) choroid      (D) Retina
49. Which regions of eye consist of dense connective tissue ?  
 (A) sclera      (B) Sclera and cornea  
 (C) Choroid and retina      (D) Retina and ciliary body
50. Which of the following option is correct for mechanism of vision  
 (A) Light - photosensitive cell - scotopsin - dissociate - signal to ganglion cell - transmission of signal to visual area  
 (B) Light - Transmission of signals of ganglion cell - photoreceptive cell - transmission signals to visual area  
 (C) Light -Transmission of signals to visual degradation of scotopsin - photosensitive cells  
 (D) None of the given
51. What is the stiff edge of pinna called ?  
 (A) Tympanum      (B) Lobule      (C) Fenestra roundata      (D) Helix

52. Which of the following option is correct for the correct matched pairs for Column I and II and Column III

**Column - I**

- (a) aqueous humor
- (b) Vitreous humor
- (c) Blind spot
- (d) Fovea

**Column II**

- (i) Depression on retina
- (ii) watery fluid
- (iii) Absence of sensitive cells
- (iv) thick fluid

**Column III**

- (f) origin of optic nerve
- (g) secreted by retina
- (h) presence of cone cell
- (i) secreted by Ciliary body

- (A) (a - ii-i), (b - iv-g), (c - - ii- f) (d - i - h)
- (B) (a - I - f), (b, II, i) (c, III - g) (d - IV - h)
- (C) (a - I - i), (b - II- h), (C - II - f), (d - IV- g)
- (D) None of the given

53. Permeability of which of the following increases during depolarization ?

- (A)  $\text{Na}^+$                       (B)  $\text{K}^+$                       (C)  $\text{Mg}^+$                       (D)  $\text{Ag}^+$

54. Several statements are given here in reference to cone cells which of the following option indicates all correct statements for cone cells ?

Statements

- (i) cone cells are less sensitive than Rod cells
- (ii) They are responsible for colour vision
- (iii) Erythrolobe is photopigment which is sensitive to red colour light
- (iv) They are absent in fovea of retina

- (A) (iii), (ii) and (i)              (B) (ii) and (iii) (iv)              (C) (iii) and (iv)              (D) (i) and (ii) (iv)

55. Which of the following of are main divisions of autonomous nervous system

- (A) limbic system and Hippocampus                      (B) Sympathetic and limbic system  
(C) Sympathetic and para sympathetic                      (D) Brain and spinal cord

56. Which of the following option indicates correct chronology of structures of the ear (from outside is inside) ?

- (A) cochlear duct - utricle - sacule                      (B) Saccule - utricle - cochlear duct  
(C) utricle - saccule - cochlear duct                      (D) Utricular - cochlear duct - saccule

57. Few statements about tympanic membrane are given here which of the following option shows all correct statement for it ?

- (i) malleus bone join with it
- (ii) it is oval membrane consist of unstriated muscle
- (iii) It has cover of skin on its inner side and muscle layer on outside
- (iv) It has upper aperture called fenestra roundata

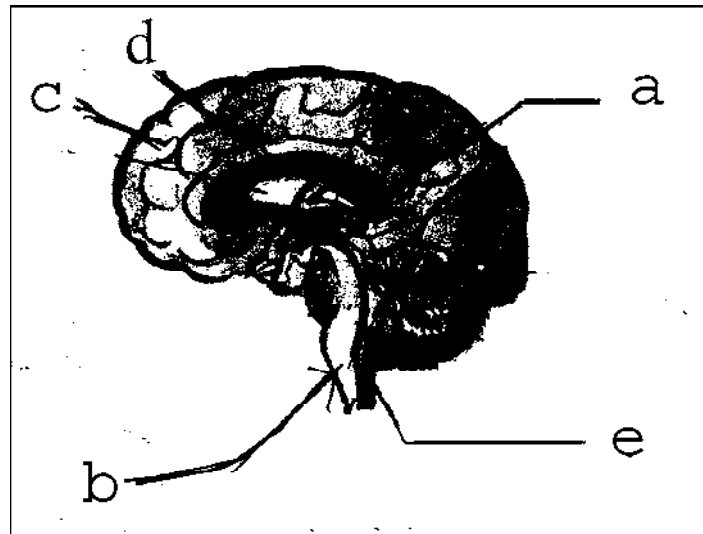
- (A) (i)                      (B) (i) and (ii)                      (C) (ii) and (iii)                      (D) (i), (iv), (iii)

58. Which of the following option indicates correct chronology of middle ear ossicle (from Tympanum to internal ear)

- (A) Incus - malleus - stapes                      (B) malleus - Incus - stapes  
(C) stapes - malleus - Incus                      (D) malleus - stapes - Incus

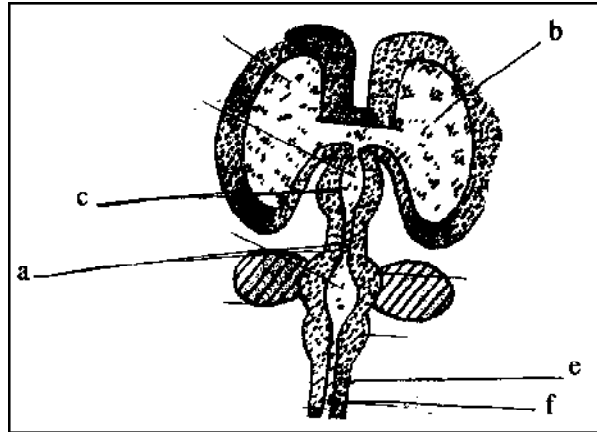
59. It is correct for the function of ear ossicle  
 (A) To amplify sound 40 times (B) To amplify sound 20 times  
 (B) To amplify sound 10 times (D) To reduce harmful effect of sound
60. Which of the following is filled with perilymph ?  
 (A) Area around cochlear duct on outer side (B) In lumen of vestibule  
 (C) In semicircular canal (D) In lumen of sacculus
61. Which of the following option shows correctly matched groups for the column I, column II and column III
- | column I                | column II                                   | column III                       |
|-------------------------|---|----------------------------------|
| (a) multiple sclerosis  | (i) degeneration of intervertebral disc     | (e) continuous pain in back      |
| (b) Parkinson's disease | (ii) Myelin sheath around nerves is damaged | (f) Defect in speech             |
| (c) sciatica            | (iii) Deficiency of dopamine                | (g) lack of spontaneous movement |
- (A) (a - i - g), (b - ii - f), (c - i - e) (B) (a - ii - f), (b - iii - g), (c - i - e)  
 (C) (a - iii - e), (b - ii - f), (c - i - g) (D) (a - iii - f), (b - ii - e), (c - i - g)
62. What is ciliary body ?  
 (A) Thick posterior part choroid (B) Thick anterior part of sclera  
 (C) Thick posterior part of sclera (D) Thick anterior part of choroid
63. Iris is a continuation of \_\_\_\_\_  
 (A) ciliary body (B) choroid (C) Retina (D) None of the given
64. Which type of muscle are present in ciliary body ?  
 (A) Radial & oblique (B) Horizontal & oblique  
 (C) Radial and longitudinal (D) All of the given
65. What is macula lutea ?  
 (A) A yellow pigmented area with cone cell  
 (B) fovea centralis of retina, with cone cells  
 (C) A yellow pigmented area of Choroid with rod cell  
 (D) Blind spot on retina
66. which basic Colour Photoreceptors are Present in human eye ?  
 (A) Red Yellow Orange (B) Red green blue  
 (C) Red green Orange (D) green yellow blue
67. which of the following has nerve centers for the urge of eating ?  
 (A) Pons (B) Thalamus (C) Hypothalamus (D) mid - brain
68. Deficiency abnormality of which of the following is responsible for Alzheimer's disease?  
 (A) cortisone (B) Acetyl choline (C) Adrenaline (D) nor - epinephrine
69. What is correct for the "number" of vagus Cranial nerve?  
 (A) 6 (B) 5 (C) 10 (D) 12
70. At which of the following Structure Sensitivity of retina is highest?  
 (A) Rod cells of Fovea centralis (B) Yellow spot  
 (C) Blind Spot (D) None of the given

Diagram for question number 71 to 75.



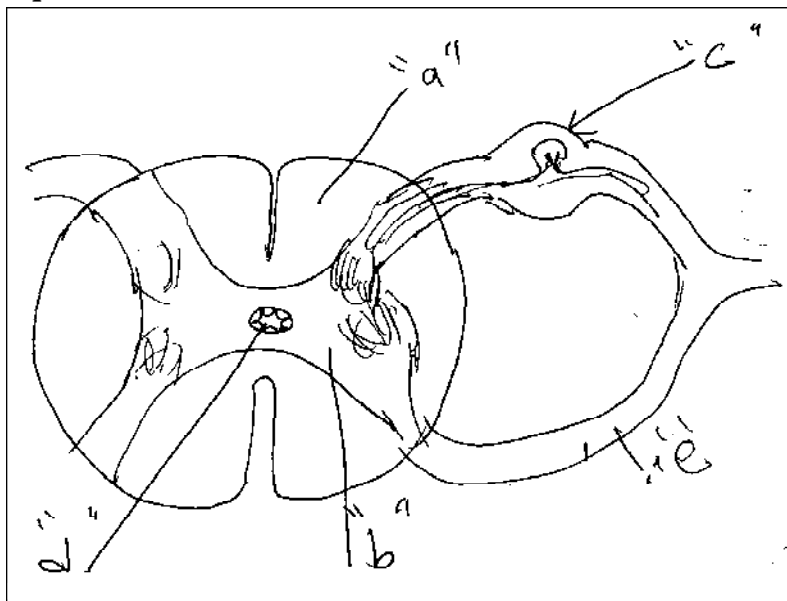
71. What does “a” indicate in the given diagram?  
 (A) Cerebral hemisphere (B) Optic Chiasmata  
 (C) Olfactory bulb (D) Pineal gland
72. Which option is correct for the region labelled as “b”  
 (A) medulla oblongata - Hind brain - Involuntary Function  
 (B) Occipital lobe - Hind brain - Audio - Visual Centres  
 (C) medulla oblongata - Hind brain - Site of intelligence  
 (D) Pons Varolli - Mid brain - Axonal Fibre
73. What does “c” indicate in the given diagram?  
 (A) Cerebellum (B) Occipital Lobe (C) Cerebrum (D) Parietal Lobe
74. Which option is correct for the region labelled as “d”?  
 (A) Corpus callosum - Consist of large number of non - myelinated nerve fibre  
 (B) Cerebral Cortex - With white mater  
 (C) Cerebellar hemisphere - with white mater  
 (D) Corpus Callosum - Consist of large number of myelinated Fibre
75. What is the function of region labelled as “e”?  
 (A) Secrete growth hormone (B) Secrete melatonin  
 (C) Releases nutrient for the brain (D) Carry impulse of Vision

**Diagram for question number 76 to 79**



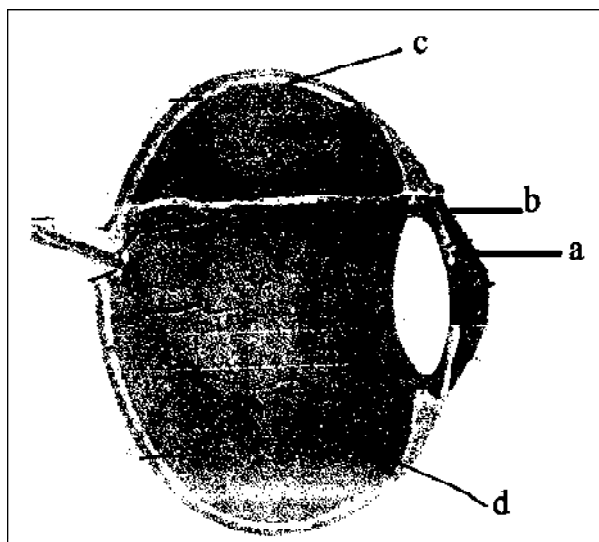
76. What does “a” indicate on the given diagram.  
 (A) Mid brain                      (B) Third Ventricle                      (C) Lateral Ventricle                      (D) crebaral aqueduct
77. What does “b” indicate in the given diagram?  
 (A) - Iter                      (B) Lateral Ventricle                      (C) Central Canal                      (D) 4<sup>th</sup> Ventricle
78. Which option is Correct for the region labelled as “c”?  
 (A) Central Canal                      (B) 3<sup>rd</sup> Ventrile                      (C) Medulla Oblongala                      (D) Spinal Cord
79. What does “e” and “f” indicates in the given diagram?  
 (A) e = Third Ventricle                      (B) e = Spinal Cord  
     f = DienCephalon                      f = Central Canal  
 (C) e = Diencephalon                      (D) e = Third Ventricle  
     f = fourth ventricle                      f = medulla Oblongata

**Diagram for question number 80 to 82**



80. Which of the following option is correct for the region labelled as “ a ” a and b ?  
 (A) a = origin of Sensory nerve                      (B) a = Origin of motor nerve  
       b = Origin of motor nerve                        b = Origin of Sensory nerve  
 (C) a = White matter b = gray matter            (D) a = Grey matter b= white matter
81. Identify the region labelled as “ C ” and which of the following option is correct for the Significance of it?  
 (A) Ventral root ganglion = only of the unipolar nerve are present  
 (B) Dorsal root ganglion = only dendrites of the unipolar nerve are present  
 (C) Ventral root ganglion = Cyton of bipolar neuron are present  
 (D) Dorsal root ganglion; it has unipolar neurons Cell body
82. What does “ d ” and “ e ” represent in the given diagram?  
 (A) d = Sensory cells, e = Central canal            (B) d = Fourth ventricle, e = motor neuron  
 (C) d = Motor neuron, e = Central canal            (D) c = Central canal d = motor nerv

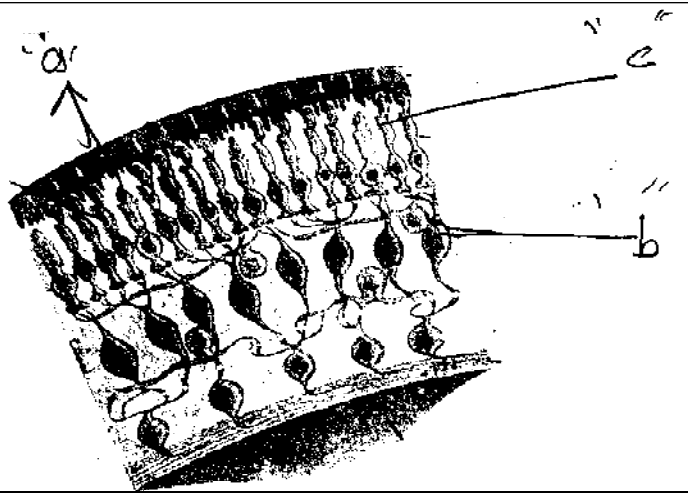
**diagram for question number 83 to 86**



83. What is the function of region Labelled as “ a ” in the given diagram?  
 (A) dispersion of the light rays  
 (B) Stop entry of u - v rays of light  
 (C) Allow only red, green and yellow colour of enter in an eye  
 (D) Regulate light rays entering in eye
84. what does “ b ” indicate in the given diagram?  
 (A) Anterior chamber ↔ aqueous fluid                      (B) Posterior chamber ↔ thick fluid  
 (C) Anterior chamber ↔ thick fluid                            (D) Posterior chamber ↔ aqueous fluid
85. What does “ c ” indicate in the given diagram?  
 (A) Sclera                      (B) Retina                      (C) Choroid                      (D) Yellow Spot
86. What does “ d ” indicate in the given diagram?  
 (A) Anterior chamber - aqueous fluid                      (B) Posterior chamber - Thick fluid  
 (C) Anterior chamber - Thick fluid                            (D) posterior chamber - aqueous fluid

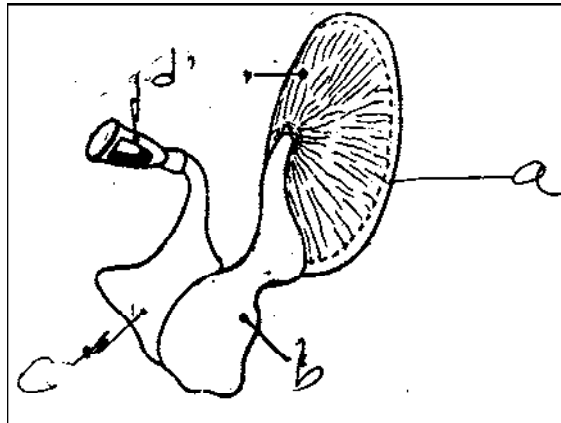


Diagram for question number 87 to 89



87. What does "a" indicate in the given diagram?  
 (A) Cone cell - Colour Vision                      (B) Cone cell - Intensity of light  
 (C) Rod cell - Colour Vision                        (D) Rod cell - Intensity of light
88. What does "b" indicate in the given diagram  
 (A) Unipolar neurons of choroid                    (B) Bipolar neurons of retina  
 (C) Bipolar neurons of sclera                      (D) Unipolar cell of retina
89. What "C" indicate in the given diagram?  
 (A) Rod cell of sclera                                (B) Rod cells of choroid  
 (C) Rod cell of retina                                (D) cone cell of sclera

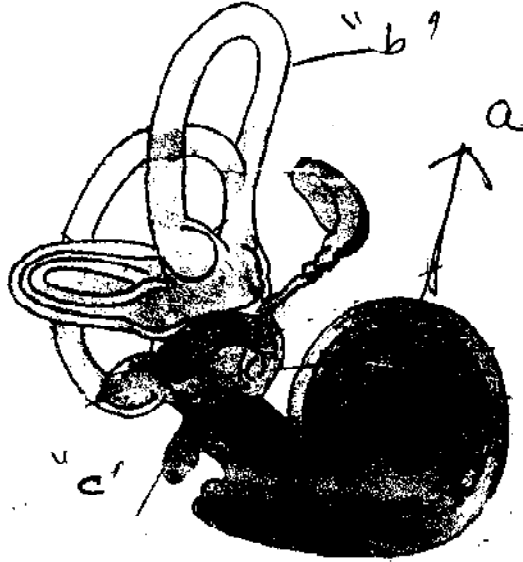
**Diagram for question number 90 to 94**



90. what does region labelled as "a" in the diagram indicate  
 (A) Tympanum                                        (B) Round window  
 (C) Oval window                                    (D) external auditory canal
91. what does "b" indicate in the given diagram?  
 (A) Incus    (B) Malleus                                        (C) stapes                                        (D) Window
92. What does "d" in the given diagram?  
 (A) Malleus    (B) Incus    (C) Round window                              (D) stapes

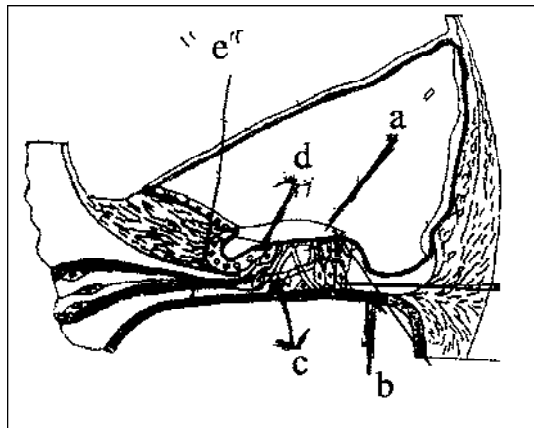
93. Which option is correct for the region labelled as c ?  
 (A) Malleus (B) Stapes (C) Round window (D) Incus
94. Which tissue is present on the innerside of the region labelled as "a" in the given diagram ?  
 (A) Muscle (B) Skeletal (C) Areolar connective (D) cartilage

**Diagram for question number 95 , 96 , 97**



95. Which option is correct for the structure and function of region labelled as "a"  
 (A) Sacule (B) Utricle (C) Ampulla (D) Chochear canal
96. Which is correct for the struture and function of region labelled as "b"  
 (A) Ampulla , equilibrium related (B) Semicircular canal equilibrium related  
 (C) chochlear canal sensitive to equilibrium (D) Ampulla Auditory centres
97. What does region labelled as "C" indicate ?  
 (A) ampulla (B) round Window (C) oval window (D) malleus bone

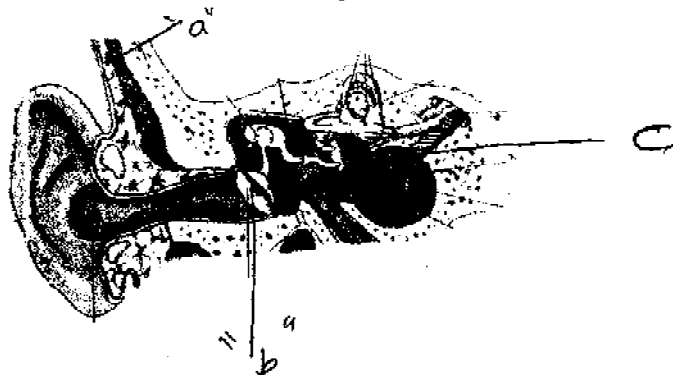
**Diagram for question number 98 to 102**



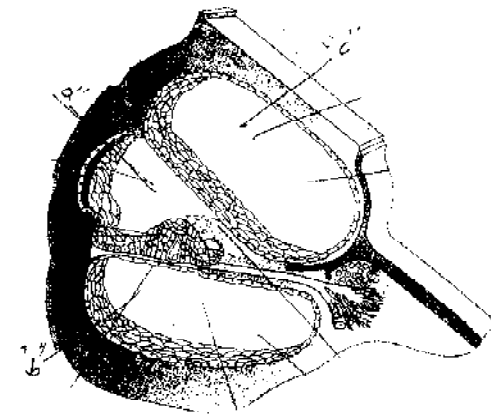
98. What does "a" indicate in the given diagram ?  
 (A) Tectorial membrane (B) Innerhair cell (C) Basiliar membrane (D) Border cell

99. What does “b” indicate in the given diagram ?  
 (A) Basilar membrane (B) Hair cell (C) Bordercell (D) scala media
100. What does “d “ indicate in the given diagram ?  
 (A) tectorial membrane (B) Outer hair cell (C) Border cell (D) Inner hair cell
101. What does “e “ indicate in the given diagram ?  
 (A) Border hair cell (B) Inner hair cell (C) Inner phalangeal cells(D) Border cell
102. What does “c “ indicate in the given diagram ?  
 (A) Basilar membrane (B) Pillar cell (C) Border cells (D) Scala media

**Diagram for question number 103 to 105**



103. What does “a “ represent in the given diagram  
 (A) Palatine bone (B) Eustachian tube (C) Temporal bone (D) Tympanic membrane
104. Which option is correct for the function and location of region labelled as “b “ in the given diagram ?  
 (A) To equlize pressure on either side of eardrum between middle ear and pharynx  
 (B) to equlize pressure on either side of eardrum between middle ear and oesophagus  
 (C) to distribute sound wave evenly between tympanum and middle ear  
 (D) None of the given
105. What does region labele as “c” indicate ?  
 (A) Vestibular nerve (B) Auditory nerve (C) cochlear artery (D) cochlear nerve
106. What does “a”, “b” and “c” indicate in the given diagram ?



- |   |   |
|---|---|
| (A) a = scala media<br>b = scala Tympani<br>c = scala vestibuli | (B) a = scala tympani<br>b = scala media<br>c = scala vestibuli |
| (C) a = scale media<br>b = scale vestibuli<br>c = scale tympani | (D) None of the given   |

107. Which of the following option is correct for the statement X, Y, and Z ?

X- cerebral cortex is called association area

Y - It contains sensory area motor area and large region that neither clearly sensory nor motor in function

Z - This region is responsible for inter sensory association memory and communication

- (A) x, y and z are correct and y and z are correct for x
- (B) x, y and z are correct and y and z are not correct for x
- (C) x is correct and y and z are correct.
- (D) x and y are correct and z is wrong.

Few statements are given in question number for the given statement X and statement Y

**option for question number 180 to 120**

- (A) A and R both are correct and R is the correct explanation for A.
  - (B) A and R both are correct and R is not correct explanation for A
  - (C) A is correct and R is wrong
  - (D) R is correct & A is wrong
108. Statement A : medulla is absent in nerves of autonomic nervous system  
 Statement R : Nerve impulse has to travel less distance in autonomic nervous system
109. Statement A : Immediately after repolarization, ionic imbalance is created on sides of nerve fibre  
 Statement R : During repolarization K ion channel open up and K ion moves on inner side of plasma membrane
110. Statement A : Injury to interior Colliculi can impair hearing  
 Statement R : centre to control auditory sense are lying in it
111. Statement A : Injury to medulla can lead to the death of an individual  
 Statement R : It has centres to regulate major involuntary functions of body
112. Statement A : cochlea can be called true organ of hearing  
 Statement R : Organ of Corti is present in it
113. Statement A : The movement (vibration) of basilar membrane is necessary for hearing  
 Statement R : movement of basilar membrane separates sensory hair from tectorial membrane
114. Statement A : Rod cells possess visual purple pigments  
 Statement R : They are sensitive to purple pigment colour light
115. Statement A : Amygdala are present in superficial region of cerebral hemisphere  
 Statement R : They make part of limbic system

116. Statement A : synapse are of two types  
Statement R : in electrical synapses pre and post synaptic membrane are in close proximity
117. Statement A : neurotransmitters are present in synaptic vesicles present in axon terminals  
Statement R : On arrival of action potential neurotransmitter unites with receptors present on pre synaptic membrane
118. Statement A : corpus callosum join two cerebral hemispheres  
Statement R : corpus callosum is formed of unipolar neurons
119. Statement A : optic nerve leave eye ball at little lower and posterior pole of the eye ball  
Statement R : Photosensitive cells are not present at this place
120. Statement A :  $\text{Na}^+$  and  $\text{K}^+$  pumps are activated after repolarization  
Statement R : By them ionic imbalance created due to repolarization is removed
121. Given below is a table comparing the effects of sympathetic and parasympathetic nervous system for four feature (1-4) which one feature is correctly described? **(A.I.I.M.S.2006)**
- | Feature                    | sympathetic nervous system | parasympathetic nervous system |
|----------------------------|----------------------------|--------------------------------|
| (A) Salivary gland         | inhibit secretion          | stimulate secretion            |
| (B) pupil of the eye       | dilate                     | constricts                     |
| (C) heart rate             | decreases                  | increases                      |
| (D) intestinal peristalsis | stimulates                 | inhibits                       |
122. Cranial nerves supplying eyes muscles are:  
**(Pb.P.M.T.1997)**
- (A) 4,5,6                      (B) 3,4,5                      (C) 4,6,7                      (D) 3,4,6
123. A cranial nerve with maximum branches in the body is  
**(M.P.P.M.T.1997,A.P.M.E.E 1999,C.B.S.E 1999)**
- (A) Auditory                      (B) Trigeminal                      (C) Vagus                      (D) Facial
124. Bowman's glands are located in **(C . B . S . E 2007)**
- (A) Olfactory epithelium of human nose                      (B) Female reproductive system of cockroach  
(C) Anterior pituitary                      (D) Proximal end of uriniferous tubules
125. Which of the following disorder is not hereditary **(J.K.C.M.E.E 2005)**
- (A) sickle cell anaemia    (B) haemophilia                      (C) colour blindness                      (D) cataract
126. Glands responsible for secreting tears are: **(H.P.P.M.T 2005)**
- (A) glands of moll                      (B) lacrimal glands                      (C) meibomian glands                      (D) glands of zeis
127. Which of the following cranial nerves are mixed: **(BHU 2007)**
1. glossopharyngeal                      2. trigeminal                      3. vagus                      4. auditory
- (A) 1,2 and 3 are correct                      (B) 1 and 3 are correct  
(C) 1 and 2 are correct                      (D) 2 and 4 are correct

128. To What the resparatory centres of brain are sensitive?  
 (A) High CO<sub>2</sub> Conc in blood                      (B) Blood supply to brain  
 (C) High O<sub>2</sub> Conc in blood                      (D) More blood supply to lungs
129. Nasal epithelium is formed of : (C.M.C 2003)  
 (A) columnar epithelium                      (B) keratinised epithelium  
 (C) pseudostratified epithelium                      (D) glandular epithelium
130. Space between piamater and arachnoid is (J.K.C.M.E.E 2003)  
 (A) subdural                      (B) supra archnoid(C) eqidural                      (D) subarachnoid
131. Which one is mixed nerve  
 (A) oculomotor                      (B) trochler                      (C) hypoglossal                      (D) glossopharyngeal
132. Visual area is localised in (A.I.E.E.E 2004)  
 (A) occipital lobe                      (B) parietal lobe                      (C) frontal lobe                      (D) temporal lobe
133. In hypothalamus are located various centres of (J.I.P.M.E.R 2004)  
 (A) circulation                      (B) sleep                      (C) memory                      (D) body temprature
134. Which option is correct for the few statements are given for the function of cerebram, which of few following option is shows all correct statements.  
 (i) to control the sensitivity,movement,memory,vocabulary etc. through the frontal lobe  
 (ii) to control the vision and adaptation through the occipital and frontallobes  
 (iii) to control the contraction of voluntary muscles through the frontal lobe  
 (iv) to control the temperature,taste,touch,pain etc, through the parietal lobe  
 (A) (i),(ii),(iii)                      (B) (iii),(iv),(i)                      (C) (i),(iii),(iv)                      (D) (i),(ii)
135. column I lists the part of the human brain and column II lists the functions. Match the two column and identify the correct choice from those given. (K.C.E.T 2005)
- | <b>column I</b> | <b>column II</b>                  |
|-----------------|-----------------------------------|
| a. cerebrum     | p. controls the pituitary         |
| b. cerebellum   | q. control vision and hearing     |
| c. hypothalamus | r. control the rate of heart beat |
| d. midbrain     | s. seat of intelligence           |
|                 | t. maintains body posture         |
- (A) (a=s);(b=t);(c=p);(d=q)                      (B) (a=t);(b=s);(c=r);(d=q)  
 (C) (a=t);(b=r);(c=p);(d=q)                      (D) (a=t);(b=s);(c=q);(d=p)
136. It control auditory reflex  
 (A) pons                      (B) inferior colliculi                      (C) pineal body                      (D) superior colliculi
137. In the resting state of the neural membrane,diffusion due to concentration gradients,if allowed would drive: (C.B.S.E 2004)  
 (A) Na<sup>+</sup> out of the cell                      (B) k<sup>+</sup> into the cell  
 (C) Na<sup>+</sup> into the cell                      (D) k<sup>+</sup> and Na<sup>+</sup> out of the cell

138. Injury vagus nerve in humans is not likely to affect: **(C.B.S.E 2004)**  
 (A) gastrointestinal movements (B) cardiac movement  
 (C) tongue movement (D) pancreatic movement
139. unidirectional transmission of a nerve impulse through nerve fibre is due to the fact that:  
 (A) sodium pump starts operating only at the cyton and then continues into the nerve fiber  
 (B) nerve fiber is insulated by a medullary sheath  
 (C) neurotransmitters are released by the axon endings  
 (D) neurotransmitters are released by dendrites
140. Which of the following is not strictly considered a part of neuron? **(C.P.M.T 1998)**  
 (A) dendrites (B) myelin sheath (C) axon (D) Nissle's bodies
141. Centres for sense of smell are located **(M.P.P.M.T 1999)**  
 (A) cerebellum (B) midbrain (C) olfactory lobes (D) cerebrum
142. Nerve related to diaphragm is **(M.P.P.M.T 1999)**  
 (A) trigeminal (B) vagus (C) glossopharyngeal (D) phrenic
143. Node of Ranvier is the place where **(C.B.S.E.P.M.T 2002)**  
 (A) myelin sheath and neurilemma are discontinuous  
 (B) axolemma is absent  
 (C) axolemma is discontinuous  
 (D) myelin sheath is discontinuous
144. which of the following cranial nerve controls the movement of eye ball? **(B.H.U 2002)**  
 (A) trochlear (B) oculomotor (C) abducens (D) all of the given
145. Match the following human spinal nerves in column I with their respective number in column II and choose the correct option **(Kerala 2005)**
- | <b>column I</b>                 | <b>column II</b>                   |
|---------------------------------|------------------------------------|
| P. cervical nerves              | i. 5 pairs                         |
| Q. thoracic nerve               | ii. 1 pair                         |
| R. lumbar nerve                 | iii. 12 pair                       |
| S. coccygeal nerve              | iv. 8 pair                         |
| (A) (P-iv),(Q-iii),(R-i),(S-ii) | (B) (P-iii), (Q-i), (R-ii), (S-iv) |
| (C) (P-iv),(Q-i),(R-ii),(S-iii) | (D) (P-ii), (Q-iv), (R-i), (S-iii) |
146. How many pairs of spinal nerve are found in human? **(Guj C.E.T 2006)**  
 (A) 33 (B) 32 (C) 31 (D) 30
147. What is Nissl's granule consist of? **(C.B.S.E 2007)**  
 (A) DNA (B) RNA (C) protein (D) lipid

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148. Which of the following is correct for motor nerve? **(A.I.E.E.E 2004)**  
(A) trochlear      (B) hypoglossal      (C) oculomotor      (D) All the given
149. Four healthy people in their twenties got involved in injuries resulting in damage and death of a few cells of the following . Which of the cells are least likely to be replaced by new cells ? **(C.B.S.E 2005)**  
(A) liver cells      (B) osteocytes      (C) neurons      (D) malpighian layer of the skin
150. One of the examples of the action of the autonomous nervous system is : **(C.B.S.E 2005)**  
(A) peristalsis of the intestines      (B) knee-jerk response  
(C) swallowing of food      (D) pupillary reflex
151. Mouth becomes watery when we look at a delocious food due to  
(A) optic response(B) olfactory response      (C) Hormonal response      (D) neural response
152. Which of the following cranial nerve is not a motor nerve.  
(A) XII      (B) IV      (C) II      (D) III



**Answer – Key**

1	B	31	B	61	B	91	B	121	B
2	D	32	C	62	D	92	C	122	D
3	B	33	B	63	A	93	D	123	B
4	C	34	B	64	A	94	A	124	A
5	D	35	B	65	B	95	D	125	D
6	C	36	D	66	B	96	B	126	B
7	D	37	B	67	C	97	A	127	A
8	D	38	B	68	B	98	A	128	A
9	C	39	A	69	C	99	A	129	D
10	A	40	D	70	B	100	D	130	D
11	B	41	C	71	D	101	D	131	D
12	C	42	A	72	A	102	B	132	A
13	A	43	A	73	C	103	C	133	D
14	D	44	C	74	D	104	D	134	B
15	A	45	A	75	C	105	D	135	A
16	C	46	A	76	D	106	A	136	B
17	A	47	C	77	B	107	A	137	B
18	D	48	A	78	B	108	A	138	C
19	B	49	A	79	B	109	C	139	C
20	D	50	A	80	C	110	A	140	B
21	C	51	D	81	D	111	A	141	C
22	A	52	A	82	D	112	A	142	D
23	D	53	A	83	D	113	C	143	D
24	C	54	A	84	A	114	C	144	B
25	B	55	C	85	C	115	D	145	A
26	A	56	C	86	B	116	A	146	C
27	A	57	A	87	C	117	C	147	C
28	B	58	B	88	B	118	C	148	D
29	C	59	B	89	C	119	D	149	C
30	A	60	A	90	A	120	A	150	A
								151	A
								152	C

## Unit-V

### Chapter 25. Chemical Coordination and Control

#### IMPORTANT POINTS

Animals maintain dynamic equilibrium amongst different physiological processes. Endocrine glands play an important role in regulating various physiological processes, in constantly changing environment. ADH secretion either stops or decreases, when water amount in body increases. Hence concentration of urine decrease and surplus water of body is **removed**. When sugar in blood increases, immediately insulin will convert this surplus glucose into glycogen and minimum required glucose level of the blood is maintained. Endocrine glands are ductless gland, its secretion is poured in the blood. Endocrine glands are very specific vary greatly in their location, embryonic origin and functions.

Pituitary gland and pineal gland are found in head region. Thyroid gland is present in neck, Thymus gland is present in thoracic region, Adrenal gland and ovary are present in abdominal region. Testes are present outside body in scrotum (As development of sperm require comparatively less temperature, than normal body temperature).

The secretions of endocrine glands are different from each other in their chemical nature. Hormones of Pituitary, Pineal and cells of islet of Langerhans are chemically peptide or polypeptide and protein. Hormones of adrenal cortex are steroids. Epinephrin (Hormone of adrenal) is derivative of amino acid.

Hypothalamus regulate secretion of anterior pituitary gland through various releasing hormones (RH). Posterior pituitary lobes hormone are secreted by hypothalamus neurons directly Other than GH, every hormone of anterior pituitary stimulates some other gland of body to release its hormone, Hence these hormones are called tropic hormone. GH directly act on the cells and tissues and regulates their growth. Pineal glands secretion mainly regulates 24 hours rhythm of body

Hormones of thyroid gland [Thyroxine, T<sub>4</sub>] controls processes like carbohydrate metabolism. ATP synthesis and osteoblast. Hormones of parathyroid gland regulate Ca<sup>2+</sup> level in blood. Thymus gland atrophies in adult, its hormone provide immunity to the body. they stimulate development and differentiation of T-lymphocytes. It also gives humoral immunity and stimulates antibody production.

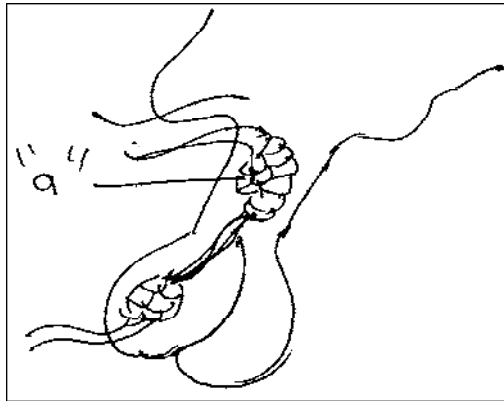
The adrenal gland is present in abdominal region and it is divided into two distinct regions; cortex and medulla. Hormones of cortex regulates carbohydrate metabolism and osmoregulation, Glucocorticoids of cortex region regulates carbohydrate metabolism, mineralocorticoids of cortex region regulates level of water and mineral ions. Sexcorticoids of adrenal cortex enhances secondary sexual characters. Adrenal medulla secretion epinephrine and non-epinephrine, which are called catecholamine. All physiological changes, which arises in stress conditions are under the effect of these hormones. Cells of islet of langerhans make endocrine part of pancreas. Insulin and glucagon are secreted by endocrine part of pancreas and they regulate sugar level in blood.

Ovary and testes are endocrine glands. Ovary secretes Estrogen, progesterone and relaxin. Testes secretes androgens. Testosterone is the most potent hormone. These hormone regulates expression of secondary sexual characteristics.

Other endocrine gland, there are several non-endocrine cells/ tissues known to secrete certain secretions, which are known as growth factors. these growth factors have role in general growth and the process like regeneration. ANF (secreted by atrial wall of heart). Erythropoietin (secreted by JGA), CCK, GIP (secreted by gastro-intestinal wall) are examples of growth factors. Precisely hormones are chemical messengers, which regulates growth and development by accelerating or inhibiting enzyme activity.

**For the given questions select the correct option (a, b, c, d) each carries one mark.**

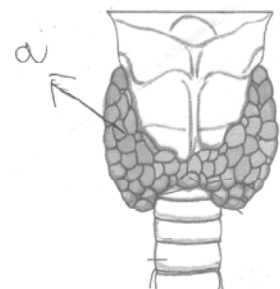
1. By which structure, hypothalamus is connected with anterior lobe of pituitary gland?  
 (a) Dendrites of neurohypophysis (b) Axons of neurohypophysis  
 (c) Bands of white fibres from cerebellar region (d) Hypophysial portal system
2. What does "a" indicate in the given diagram?



- (a) Arterial circulation (b) Portal circulation  
 (c) Hypothalamus glomerulus (d) None of the given
3. If secretory cells of GHRH are damaged then .....  
 (a) The process of cell division will be adversely affected  
 (b) Urine amount will increase  
 (c) Sugar level in blood increases  
 (d) ADH secretion will increase
4. Pituitary gland is located in a, which is b of c bone?  
 (A) a = Sella turcica  
     b = Raised surface  
     c = Ethmoid  
 (B) a = Reket's pouch  
     b = Depression  
     c = Nasal  
 (C) a = Sella turcica  
     b = Depression  
     c = Sphenoid  
 (D) a = Reket's pouch  
     b = Depression  
     c = Sphenoid
5. Which of the following hormone is directly acting on tissue cells?  
 (a) STH (b) TSH (c) LTH (d) ACTH

6. Which of the following is not effect of GH?  
 (a) Dwarfism                      (b) Cretinism                      (c) Development of all tissue                      (d) Giantism
7. Which of the following is correct for somatotropic hormone?  
 (a) Less secretions of it causes Giantism  
 (b) More secretion of it causes Dwarfism  
 (c) Optimal secretion of it can retards protein synthesis  
 (d) In adult, its more secretion causes enlargement of lower jaw
8. Write full form of ACTH?  
 (a) Adrenal Cortical Tropic hormone                      (b) Adrenocortico Target hormone  
 (c) Adrenocortex Tropic hormone                      (d) Adrenocortico Tropic hormone
9. Which of the following option indicates correctly matched pairs for the column I and column II
- | <b>Column I</b> | <b>Column II</b>                          |           |          |
|-----------------|---|-----------|----------|
| (p) PH          | (i) Contraction of smooth muscles of body |           |          |
| (q) LH          | (ii) Secretion of Glucocorticoids         |           |          |
| (r) ACTH        | (iii) Secretion of milk after delivery    |           |          |
| (s) Oxytocin    | (iv) Secretion of male sex hormone        |           |          |
| (a)(p - i)      | (q- ii)                                   | (r - iii) | (s - iv) |
| (b)(p - iii)    | (q- iv)                                   | (r - ii)  | (s - i)  |
| (c)(p - ii)     | (q- iii)                                  | (r - iv)  | (s - i)  |
| (d)(p - iii)    | (q- iv)                                   | (r - i)   | (s - ii) |
10. Which of the following are effects of Vasopressin?  
 (a) Increased glucose level  
 (b) High BMR  
 (c) Accumulation of fat under skin  
 (d) Reabsorption of water and electrolytes
11. Which of the following option is correct for the location of pineal gland?  
 (a) Under corpus callosum and between cerebral hemisphere  
 (b) Above corpus callosum and between cerebral hemisphere  
 (c) Under corpus collosum and between cerebellar hemisphere  
 (d) Lateral to cerebellar hemisphere
12. Which hormone regulate 24-hr rhythm of our body?  
 (a) Somatotropic                      (b) LTH                      (c) Melatonin                      (d) T4 and T3
13. It is correct for the function of pineal gland?  
 (a) To maintain ovarian follicle  
 (b) Self defense capability  
 (c) To maintain mineral ions in body  
 (d) Loss of water from body

14. It stimulates reabsorption of water from distal tubule of kidney  
 (a) ADH (b) Oxytocin  
 (c) Glucagon (d) None of the given
15. Which cells are present on the wall of thyroid follicle?  
 (a) Squamous (b) Cuboidal  
 (c) Columnar (d) Ciliated squamous
16. Which of the following shows abnormality in skin, stunted growth and deaf-mutism?  
 (a) Exophthalmic goiter  
 (b) Hypothyroidism, myxoedema  
 (c) Hypothyroidism, cretinism  
 (d) Hyperthyroidism, cretinism
17. Which of the following causes formation of osteoblast?  
 (a) Thyroxine (b) PTH (c) Thyrocalcitonin (d) T3
18. What is cause of exophthalmic goiter?  
 (a) Less secretion of thyroid (b) Under secretion of parathyroid  
 (c) Oversecretion of parathyroid (d) Oversecretion of thyroid
19. a and b hormones together maintain  $Ca^{+2}$  level of body?  
 (a) PTH and TCT  
 (b) PTH and aldosterone  
 (c) TCT and ADH  
 (d) T3 and T4
20. Which of the following is correct?  
 (a) Glucose  $\xrightarrow[\alpha\text{-cells}]{\text{Insulin}}$  Glycogen  
 (b) Glycogen  $\xrightarrow[\alpha\text{-cells}]{\text{Glucagon}}$  Glucose  
 (c) Glucose  $\xrightarrow[\alpha\text{-cells}]{\text{Glucagon}}$  Glycogen  
 (d) Glucose  $\xrightarrow[\beta\text{-cells}]{\text{Glucagon}}$  Glycogen
21. Which of the following disorder occurs due to deficiency of ADH?  
 (a) Diabetes incipidus (b) Diabetes mellitus (c) Highly concentrated urine formation  
 (d) Rapid reabsorbtion of nutrient
22. It is required for differentiation of T-cells?  
 (a) T3 (b) Thymosin (c) T4 (d) Melatonin
23. What does "a" indicate in the given diagram, and what is the function of the labelled region?  
 (a) Thyroid; More Secration decreases BMR  
 (b) Parathyroid; regulate  $Ca^{+}$  level in blood  
 (c) Thyroid; regulate BMR  
 (d) Parathyroid; regulate BMR

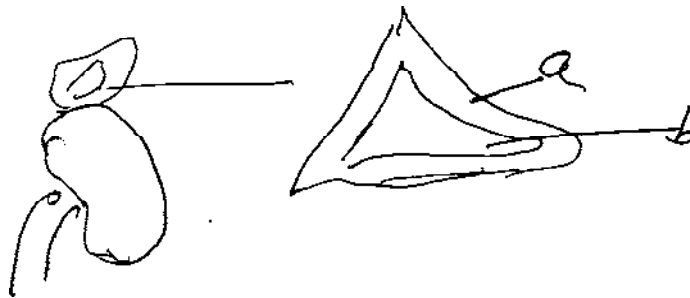


24. Which hormone is secreted by Zona fasciculata?  
 (a) ADH                      (b) Mineralocorticoids    (c) Glucocorticoids        (d) Hydrocorticoids
25. Which of the following option is correct for the correctly matched groups of column I, column II and column III ?

<b>Column I</b> (Name of glands)	<b>Column II</b> (Name of hormones)	<b>Column III</b> Functions
(a) Posterior pituitary	(i) Relaxin	(f) Regulate carbohydrate metabolism.
(b) Adrenal medulla	Catecholamines	(g) Milk secretion from mammary gland
(c) parathyroid	Glucocorticoids	(h) Decrease $Ca^{+2}$ absorption from food
(d) Ovary	Oxytocin	(i) Increase $Ca^{+2}$ absorption from digested food
(e) Adrenal cortex	PTH	(j) Relax cervix of the uterus (k) Pupillary dilation

- (a) (a - iv - j), (b - ii - j), (c - iii - k), (d - u - f), (e - i - h)  
 (b) (a - iv - i), (b - ii - f), (c - iii - j), (d - u - k), (e - i - h)  
 (c) (a - iv - j), (b - ii - i), (c - iii - j), (d - u - k), (e - iii - h)  
 (d) (a - iv - g), (b - ii - k), (c - v - i), (d - i - j), (e - iii - f)

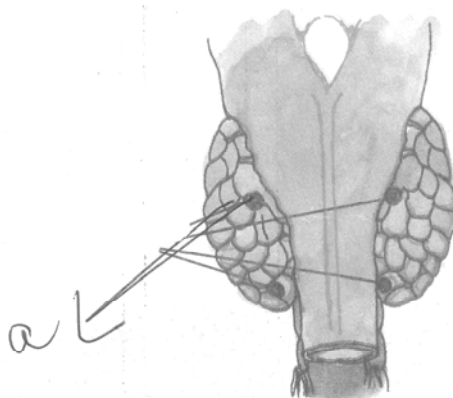
26. Which hormone's secretion increases in emergency?  
 (a) Thyroxine              (b) Parathormone        (c) Adrenaline              (d) Aldosterone
27. which of the following option is correct for secretion of region labelled as "a" and "b" in the given diagram?



- (A) a = Aldosterone  
       b = Cortisol
- (B) a = Adrenaline  
       b = Cortisol
- (C) a = Glucocorticoids  
       b = Adrenaline
- (D) a = nor - epinephrine  
       b = Adrenaline

28. Which of the following secretes mineralocorticoids?  
 (a) Zona glomerulosa (b) Zona Reticularis (c) Zona Fasciculata (d) Adrenal medulla
29. Which of the following stimulates adrenal gland in an emergency?  
 (a) Adrenal medulla (b) CNS (c) PNS (d) Mid-brain
30. Under secretion of which hormone can cause diabetes mellitus?  
 (a) Vasopressin (b) ADH (c) Aldosterone (d) Insulin
31. Which disease occurs due to less secretion of mineralocorticoids?  
 (a) Addison's disease (b) Cretinism  
 (c) Myxedema (d) Cushing diseases
32. Which hormone increases blood calcium level?  
 (a) Thyroxine (b) Thyrocalcitonin  
 (c) PTH (d) All of the above
33. Which gland atrophies after puberty?  
 (a) Thymus (b) Thyroid (c) Parathyroid (d) adrenal
34. Secretion of which of the following is necessary for increase in uptake of glucose by liver and adipose cells ?  
 (a) Alpha cell of islet of Langerhans  
 (b) Beta cell of islet of Langerhans  
 (c) delta cells  
 (d) B cells of pancreatic acini
35. Which of the following hormones are concerned with osmoregulation?  
 (a) ADH and thyroxine (b) Aldosterone and Oxytocin  
 (c) Oxytocin and Glucocorticoids (d) All cortisols
36. Which hormone regulates colour of skin?  
 (a) MSH (b) LH (c) PTH (d) LTH
37. Which of the following hormone is not secreted under influence of pituitary gland?  
 (a) Thyroxine (b) Aldosterone  
 (c) Oestrogen (d) Glucocorticoids
38. What is full form of FSH.  
 (a) Follicular Stimulating Hormone.  
 (b) Follicle Stimular Hormone.  
 (c) Follicle Stimulating Hormone.  
 (d) Follicular Stimular Hormone.
39. It causes glycogenesis?  
 (a) Glucogen (b) Insulin  
 (c) Melatonin (d) Somatostatin

40. What is related to region labelled as "a" in the diagram?



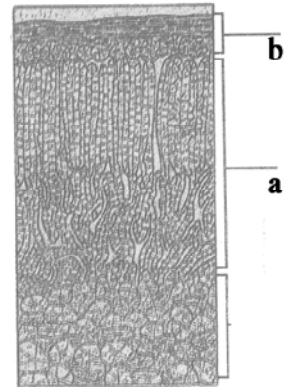
- (a) TCT                      (b) TSH                      (c) PTH                      (d) LH
41. Which option shows correct path of Libido expression?  
 (a) Leydig's cells → Androgen → sympathetic nervous system → Libido  
 (b) Androgen → Leydig's cell → PNS → Libido  
 (c) Leydig's cell → Androgen → CNS → Libido  
 (d) Epithelial cells and seminiferous tubule → Androgen → CNS → Libido
42. Which hormone regulates production of sperms?  
 (a) LH                      (b) LTH                      (c) FSH                      (d) All of the given
43. Which of the following is not primary endocrine gland?  
 (a) Adrenal medulla      (b) Parathyroid gland      (c) Thymus                      (d) Corpus luteum
44. Which hormone stimulates formation of alveoli in mammary gland?  
 (a) Oestrogen              (b) Progesterone              (c) Relaxin                      (d) Oxytocin
45. Who secrete ANF?  
 (a) Juxta glomerular apparatus                      (b) Atrial wall of heart  
 (c) Outer wall of stomach                      (d) Ventricular wall of heart
46. What is full form of ANF?  
 (a) Atrial Natriuretic factor                      (b) Atrial Natural Factor  
 (c) Anti Natriuretic Factor                      (d) Anti Nutrient Factor
47. Find the odd (In terms of source )  
 (a) ANF                      (b) Vasopressin                      (c) Adrenaline                      (d) Aldosterone
48. Which of the following option indicates correctly matched group?  
 (a) CCK- Wall of duodenum-Relaxation of gall bladder  
 (b) JGA- Erythropoietin-Formation of R.B.C.  
 (c) JGA- Erythropoietin-Degradation of R.B.C.  
 (d) GIP- Gastro- Intestinal- Stimulates gastric secretion
49. Which of the following is not effect of catecholamine?  
 (a) Sweating                      (b) Warm red face  
 (c) Increase in blood sugar level                      (d) Decreased heart beat



50. What are hormone receptors chemically?  
 (a) Protein (b) Steroid (c) Polysaccharide (d) Phospholipid
51. Which of the following is not secondary messenger?  
 (a) AMP (b) IP3 (c) Ca<sup>2+</sup> (d) T4
52. Which of the following glands hormone effects functioning of menstrual cycle?  
 (a) Pineal (b) Thyroid (c) Ovary (d) All of the given
53. Which part of following secretes LH.RH?  
 (a) Pars nervosa (b) Hypothalamus (c) Pars intermedia (d) Pars distalis
54. Which of the following is called hypercalcemic hormone  
 (a) PTH (b) Thyroxine (c) TCT (d) All of the given
55. It is steroid hormone of thyroid  
 (a) T3 (b) TCT (c) T4 (d) None of the given
56. Which hormones are directly involve in cardio-vascular activity  
 (a) Adrenaline and insulin (b) Cortisol and progesterone  
 (c) Cortisol and catecholamine (d) Catecholamine and oestrogen
57. Which of the following is not peptide protein hormone?  
 (a) Glucogon (b) Insulin (c) FSH (d) Estradiol
58. Which of the following hormones need secondary messenger for their expression?  
 (a) Glucogon and insulin (b) Cortisol and glucogon  
 (c) Insulin and hypothalamic, Cortisol (d) Cortisol and thyroxine
59. They are symptoms of diabetes mellitus  
 (a) Excess of thirst and decrease in apitite  
 (b) Excess urination, excessive thirst  
 (c) Decrease in urination; excessive thirst  
 (d) Increase in apitite; Excessive thirst
60. Which of the given statement is correct for delta cells secretion and function?  
 (a) Somatostatin; stimulates GH  
 (b) Somatostatin; Inhibitis GH  
 (c) Melatonin; stimulate Insulin  
 (d) Insulin; stimulates glucose conversion in to glycogon
61. Which hormone is secreted by two layers of the cortex?  
 (a) Sexocorticoids (b) Glucocorticoids (c) Mineralocorticoids (d) Epinephrine
62. Which hormone is secreted by delta cells?  
 (a) Insulin (b) Glucogon (c) Somatostatin (d) All of the given
63. Which of the following hormones are secreted by ovary  
 (a) Progesterone and testesterone (b) Estrogen and oxytocin  
 (c) Progesterone and testesterone (d) Estrogen and relaxin

64. What does “a” and “b” indicates in the given diagram

- (a) a=Thyroid  
b=parathyroid
- (b) a=Parathyroid  
b=Thyroid
- (c) a=Zona glomerulosa  
b=Zona reticularis
- (d) a=Zona Fasciculata  
b=Zona glomerulosa



65. Which of the following option is correct for the correctly matched pairs for column I and column II

**Column I**

**Column II**

- |                                  |                                     |
|----------------------------------|-------------------------------------|
| (p) Thymosin                     | (i) Suppresses immune response      |
| (q) Glucocorticoids              | (ii) High pitch voice               |
| (r) Deficiency of I <sub>2</sub> | (iii) Differentiation of lymphocyte |
| (s) estrogen                     | (iv) Less BMR                       |
- (A) (p-iii) (q-i) (r-iv) (s-ii)  
 (B) (p-i) (q-ii) (r-iii) (s-iv)  
 (C) (p-iv) (q-iii) (r-ii) (s-i)  
 (D) (p-ii) (q-iii) (r-iv) (s-i)

66. Secretion of which hormone; if decreases can cause Addison's disease?

- (a) PTH                      (b) TCT                      (c) ACTH                      (d) oxytocin

67. Several statements are given in reference with thyroid gland; which of the given option shows all wrong statements for thyroid gland

Statements

- (i) It inhibits process of R.B.C. formation
- (ii) It helps in maintenance of water and electrolytes
- (iii) Its more secretion can reduce blood pressure
- (iv) It Stimulates osteoblast

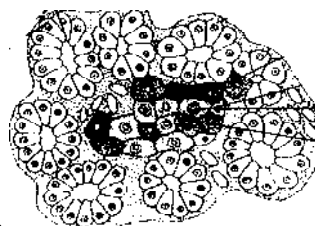
- (A) (i) and (ii)              (B) (iii) and (iv)              (C) (i) and (iv)              (D) (i) and (iii)

68. Which of the following option is not correct for the state of body in stress ?

- (a) Increased heart-beat                      (b) Increased alertness  
 (c) Increased glucose level of blood                      (d) Rate of protein synthesis increases

69. Which option is correct for the name and secretion of the gland labelled as “a”?

- (a) Pancreas-insulin
- (b) Pancreas-oxytocin
- (c) Liver-bile
- (d) Thymus-Thymosine



70. Identify the gland label as "a" ?  
 (a) Pancreas  
 (b) Thyroid gland  
 (c) Thymus gland  
 (d) None of the given

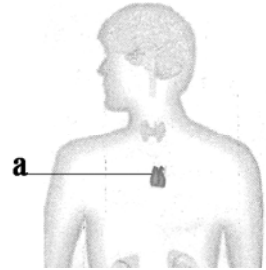
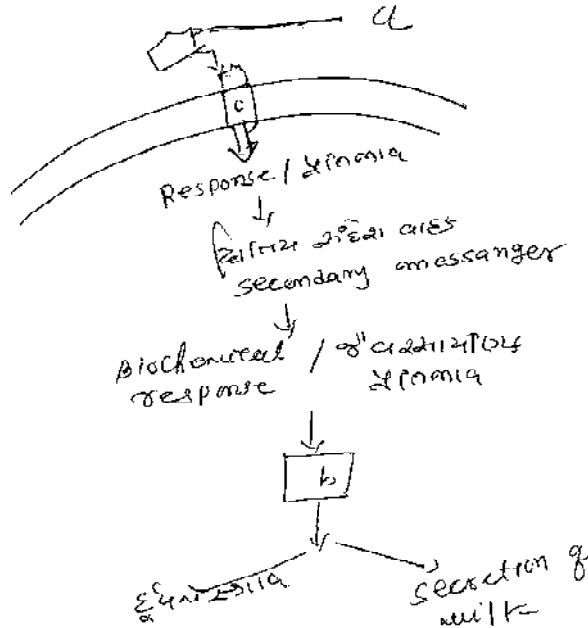
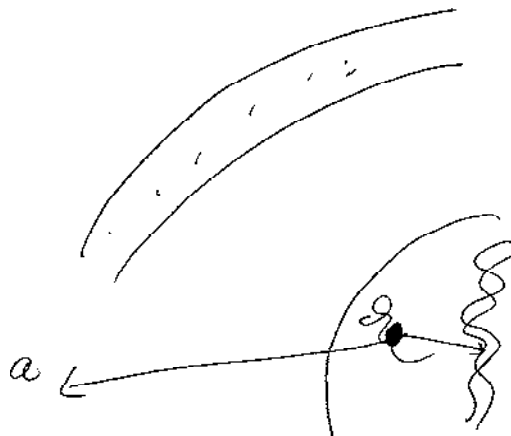



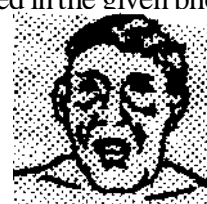

Diagram for question number 71 & 72



71. Which option is correct for the region labelled as "a" and "b" ?  
 (a) a=oxytocin b=c-AMP  
 (b) a=FSH b= AMD  
 (c) a- LH b= c-AMD  
 (d) a=peptide hormone FSH b=cyclic AMP
72. What does "c" represent in the diagram ? Which option is correct for its significance  
 (a) c=Hormone receptor, protein hormone can not express itself without it  
 (b) c= FSH, it is primary messenger  
 (c) c- AMP, secondary messenger  
 (d) c-AMP, Work in place of  $Ca^{+2}$

Diagram for 73 t o 74



73. Which of the following hormone follows mechanism shown in the diagram  
 (a) Progesterone      (b) Insulin      (c) Glycogen      (d) Adrenaline
74. Which of the following option is correct for the region labelled as “a” in the given diagram  
 (a) It acts as primary messenger  
 (a) It acts as secondary messenger  
 (a) It increases negative feedback  
 (a) It stimulate gene expression
75. Which disorder is isolated in the given diagram, and which of the following option is correct for its effects.  
 (a) Myxoedema  
 (b) Addison’s disease  
 (c) Cushing’s syndrome  
 (d) Exophthalmic goiter
- 
76. Which of the following option is correct for the disease observed in the given photograph?  
 (a) Hyposecretion of adrenal- Addison disease  
 (b) Over secretion of GH after puberty Acromegaly  
 (c) Alpha cells over secretion- Hyperglycemia  
 (d) None of the given
- 
77. Which option is correct in reference to the given picture?  
 (a) Normal goiter-  $I_2$  deficiency  
 (b) Exophthalmic goiter- Over secretion of TSH  
 (c) Normal goiter- over secretion of  $I_2$   
 (d) Exophthalmic goiter- Islets secretion of goiter
- 
78. Spot the mis-matched  
 (A) Intestine - Secretin      (B) Insulin - CSK  
 (C) Atrial wall - ANF      (D) Adrenal medulla - Adrenallin
79. Which of the option shows hormones involve in carbohydrate metabolism ?  
 (A) Insulin, glucagon, Progesterone, estrogen  
 (B) Progesteron, estrogen  
 (C) Glucocorticoids, Oxytocin, eppinephrine  
 (D) Insulin, gulcagon, Glucocorticoids, eppinephrine
80. Which hormone is control by nerve axon of hypothalamus  
 (A) Oxytocin      (B) ACTH      (C) TSH      (D) ACTH and TSH
81. Which option shows self regulating hormone ?  
 (A) Insulin, glucagon oxytocin  
 (B) Insulin LH Mineralocorticoids  
 (C) Insulin, glucagon, Mineralocorticoids oxytocin  
 (D) None of the given

**In question number 82 to 101 statements are given. For the given statements which of the following option is correct**

**Option (for 82 to 101)**

**(A) x and y are correct and y is correct explanation of x**

**(B) x and y are correct and y is not correct explanation of x**

**(C) x is correct and y is wrong**

**(D) y is correct and x is wrong**

82. Statement x: Irregularities in thyroid gland can alter BMR  
Statement y: As it regulates oxidation and ATP production  
(A) (B) (C) (D)
83. Statement x: Under stress condition body hairs are raised  
Statement y: Under stressed condition secretion from adrenal medulla stops.  
(A) (B) (C) (D)
84. Statement x: Growth factors are the hormones secreted by several non-endocrine tissue  
Statement y: Growth factors do not have any role in repair and growth  
(A) (B) (C) (D)
85. Statement x: Pituitary hormones can not express, themselves in absence of secondary messenger  
Statement y: As they interact with intracellular receptor  
(A) (B) (C) (D)
86. Statement x: There is one hormone receptor for insulin and glucagon  
Statement y: Hormone receptors are specific  
(A) (B) (C) (D)
87. Statement x: Sugar level of blood increases in stress  
Statement y: Under stress condition gluconeogenesis occurs  
(A) (B) (C) (D)
88. Statement x: Corpus luteum disintegrate in middle of pregnancy, abortion of foetus takes place  
Statement y: As progesterone secretion stops  
(A) (B) (C) (D)
89. Statement x: Prolonged hyperglycemia leads to diabetes mellitus  
Statement y: It leads to formation of harmful ketone bodies  
(A) (B) (C) (D)
90. Statement x: Relaxin is secreted during birth of the child  
Statement y: As it relax cervix of the uterus for easy birth of child  
(A) (B) (C) (D)
91. Statement x: Aldosterone stimulate reabsorption of water, and  $\text{Na}^+$  ions  
Statement y: Deficiency of aldosterone causes diabetes mellitus  
(A) (B) (C) (D)

92. Statement x: Thymosin promotes production of antibodies  
Statement y: Thymosin provides cell mediated immunity  
(A) (B) (C) (D)
93. Statement x: Sometimes surgery of thyroid gland can causes  $\text{Ca}^+$  level irregularities in blood  
Statement y: As it may damage parathyroid gland  
(A) (B) (C) (D)
94. Statement x: In cancer of thyroid gland; hyperthroidism is observed  
Statement y: The rate of synthesis and secretion of thyroid hormone increases in cancerous condition  
(A) (B) (C) (D)
95. Statement x: Over secretion of pituitary results in gigantism  
Statement y: As growth-hormone stimulates cell division and protein synthesis  
(A) (B) (C) (D)
96. Statement x: If LH secretion is inhibited in female then embryonic development is not possible in female  
Statement y: Due to inhibition of LH secretion ovulation does not occur  
(A) (B) (C) (D)
97. Statement x: Over secretion of adrenal cortex result in development of facial hair.  
Statement y: As it increases secretion of androgenic steroid along with other cortical hormone  
(A) (B) (C) (D)
98. Statement x: An increase in blood pressure; ANF secretion stops  
Statement y: ANF dilates blood vessel  
(A) (B) (C) (D)
99. Statement x: Insulin get bind with membrane bound receptor  
Statement y: It does enter nucleus for it expression and it activates secondary messengers  
(A) (B) (C) (D)
100. Statement x: Many physiological reactions and developemental processes are affected by steroid hormone  
Statement y: As they regulate gene expression by interaction of membrane bound receptors complex  
(A) (B) (C) (D)
101. Statement x: On secretion of insulin glucose level in blood decreases  
Statement y: As it causes rapid movement of glucose from blood to hepatocyte  
(A) (B) (C) (D)
102. If receptor molecule is removed from target organ for hormone action, the target organ will.  
(A) Continue to respond but in opposite  
(B) not respond to hormone  
(C) Continue to respond but require higher concentration of hormone  
(D) continue to respond with out any difference

**(Manipur 2005)**

103. Match the list-I with list-II

list-I	list-II
p. adenohypophysis	i. epinephrine
q. adrenal medulla	ii. somatotropin
r. Parathyroidgland	iii. thymosin
s. thymus gland	iv. calcitonin

(A) (p : iv), (q : iii), (r : ii), (s : i)

(B) (p: iii), (q : i), (r : iv), (s : ii)

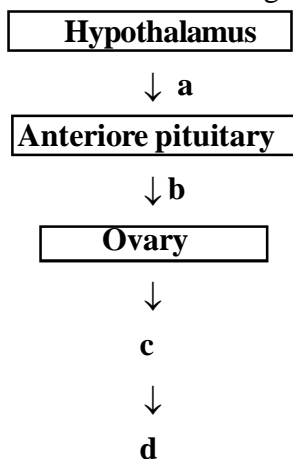
(C) (p : i), (q : ii), (r : iii), (s : iv)

(D) (p : ii), (q : i), (r : iv), (s : iii)

104. Which one of the following is not a second messenger in hormone action ? **(AIPMT 2006)**

(A) cGMP                      (B) Calcium                      (C) Sodium                      (D) cAMP

105. Choose the correct combination of labelling in the hormonal control of female reproductive system.



(A) a = GnRH, b = STH, c =LH, d = uterus

(B) a = GnRH, b = FSH/LH, c = estrogen or progesterone, d = uterus

(C) a = GnRH, b = TSH, c = LTH, d = uterus

(D) a = GnRH, b = ACTH, c = LH, d = uterus

**(Kerala 2005)**

106. match item in column-I with those given in column-II

column-I	column-II
p. ADH	a. Pituitary
q. ACTH	b. mineralocorticoid
r. aldosterone	c. diabetes mellitus
s. insulin	d. diabetes inspidus
t. adrenaline	e. vasodilator

(A) (p - d) (q - a) (r - c) (s - b) (t - e)

(B) (p - a) (q - d) (r - b) (s - c) (t - e)

(C) (p - d) (q - a) (r - b) (s - c) (t - e)

(D) (p - d) (q - b) (r - a) (s - c) (t - e)

**(kerala 2005)**

107. Which of the following indicates correctly matched pairs for column-I and column-II
- | column-I          | column-II         |
|-------------------|-------------------|
| p Leydig cells    | (i) Tetany        |
| q Hyperthyroidism | (ii) GH           |
| r Adenohypophysis | (iii) ACTH        |
| s Dwarfism        | (iv) Testosterone |
- (A) (p - iv) (q - i) (r - iii) (s - ii)  
 (B) (p - i) (q - iv) (r - ii) (s - iii)  
 (C) (p - i) (q - ii) (r - iii) (s - iv)  
 (D) (p - iii) (q - i) (r - iv) (s - ii)
108. mainly which of the following hormones control menstrual cycle in human being **(CET, 1997)**
- (A) FSH, LH, Estrogen      (B) oxytocin      (C) PTH      (D) ACTH
109. On seeing a Tiger, the heart beat and blood pressure increase due to release of hormone:
- (A.I.I.M.S 2000)**
- (A) Corticoids      (B) Thyroxine      (C) Adrenaline      (D) parathormone
110. Match the endocrine gland, given under column-I with their respective position in the body given under column-II choose the answer which gives the correct combination of alphabets of two columns:
- (K.C.E.T.1998)**
- | column-I                | column-II               |
|-------------------------|-------------------------|
| (Endocrine glands)      | (Position in body)      |
| a. pituitary gland      | p. Above kidney         |
| b. Thyroid gland        | q. Inside pancreas      |
| c. Adrenal gland        | r. On larynx            |
| d. Islets of langerhans | t. At the base of brain |
- (A) (a - t) (b - r) (c - p) (d - q)  
 (B) (a - s) (b - t) (c - p) (d - q)  
 (C) (a - p) (b - q) (c - r) (d - t)  
 (D) (a - q) (b - s) (c - t) (d - p)
111. If Adenohypophysectomy is done in adult, then which of the followings is the correct statement :
- (CPMT 1996)**
- (A) Gigantism  
 (B) Acromegaly  
 (C) B.M.R will be affected  
 (D) It will affect growth of testis and ovary
112. The immediate cause of induction of ovulation in the human female is the large plasma surge of :
- (A) LH      (B) Estrodiol      (C) FSH      (D) Progesterone





124. Chemically the hormones are : **(C.B.S.E 2004)**  
 (A) Steroids only  
 (B) Proteins, steroids and biogenic amines.  
 (C) Proteins only  
 (D) Biogenic amines only
125. Which of the following hormones is not a secretion product of human placenta ? **(C.B.S.E 2004)**  
 (A) Progesterone                      (B) HCG                      (C) Prolactin                      (D) Estrogens
126. Feeling the tremors of an earthquake a scared resident of seventh floor of a multistoreyed building starts climbing down the stairs rapidly. which hormone initiated this action ? **(C.B.S.E 2007)**  
 (A) Gastrin                      (B) Thyroxine                      (C) Adrenaline                      (D) Glucagon
127. Match list-I with list-II and select the correct option. **(Kerala 2008)**
- | list-I                 | list-II                  |
|------------------------|--------------------------|
| a) Adrenaline          | 1 Myxoedema              |
| b) Hyperparathyroidism | 2 Accelerates heart beat |
| c) Oxytocin            | 3 Salt - water balance   |
| d) Hypothyroidism      | 4 Child birth            |
| e) Aldosterone         | 5 Demineralisation       |
- (A) (a - 5) (b - 3) (c - 2) (d - 4) (e - 1)  
 (B) (a - 2) (b - 5) (c - 4) (d - 1) (e - 3)  
 (C) (a - 5) (b - 3) (c - 4) (d - 2) (e - 1)  
 (D) (a - 2) (b - 3) (c - 4) (d - 5) (e - 1)
128. Column-I lists the endocrine structure and column-II lists the corresponding hormones match the two column. Identify the correct option those given. **(K.C.E.T 2006)**
- | column-I              | column-II                          |
|-----------------------|------------------------------------|
| a. Hypothalamus       | p. relaxin                         |
| b. anterior pituitary | q. estrogen                        |
| c. testis             | r. FSH and LH                      |
| d. ovary              | s. androgens                       |
|                       | t. gonadotropin releasing hormones |
- (A) (a - r) (b - t) (c - s) (d - q)  
 (B) (a - t) (b - r) (c - s) (d - q)  
 (C) (a - p) (b - q) (c - s) (d - r)  
 (D) (a - t) (b - r) (c - q) (d - s)
129. It is the parathyroid gland.... **(A.M.U 2006)**  
 (A) decreases blood  $Ca^{+2}$  level  
 (B) Increases blood  $Ca^{+2}$  level  
 (C) promotes collagen synthesis by osteoblasts  
 (D) All of the given

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130. Removal of which of the following causes an immediate menstruation ?  
 (A) Estrogen                      (B) FSH                      (C) FSH - RH                      (D) Progesterone
131. Which of the following is not a effect of hypothyroidism ?                      **(C.B.S.E 2006)**  
 (A) Mental stress                      (B) edema  
 (C) Increases  $Ca^{+2}$  level in blood                      (D) to be lethargic

### Answer – Key

1	D	31	A	61	A	91	C	121	D
2	C	32	C	62	C	92	A	122	B
3	A	33	A	63	D	93	A	123	A
4	C	34	B	64	D	94	A	124	B
5	A	35	A	65	A	95	A	125	C
6	B	36	A	66	C	96	A	126	C
7	D	37	B	67	D	97	A	127	B
8	D	38	C	68	D	98	D	128	A
9	B	39	B	69	A	99	A	129	B
10	D	40	C	70	C	100	D	130	D
11	A	41	C	71	A	101	A	131	A
12	C	42	C	72	A	102	B		
13	B	43	D	73	A	103	D		
14	A	44	B	74	D	104	C		
15	B	45	B	75	D	105	B		
16	B	46	A	76	B	106	C		
17	C	47	A	77	A	107	A		
18	D	48	B	78	B	108	A		
19	A	49	D	79	D	109	B		
20	B	50	A	80	A	110	A		
21	A	51	D	81	D	111	C		
22	B	52	D	82	A	112	A		
23	C	53	B	83	C	113	D		
24	C	54	A	84	C	114	D		
25	D	55	D	85	C	115	A		
26	C	56	C	86	D	116	B		
27	C	57	D	87	A	117	A		
28	A	58	A	88	A	118	C		
29	B	59	D	89	A	119	A		
30	D	60	B	90	A	120	D		



## Unit-VI

### Chapter-1. Reproduction in Organisms

#### IMPORTANT POINTS

Reproduction is biological process in which organism give rise to offspring similar to itself. In living organism there are two types of reproduction. (1) Asexual reproduction and (2) Sexual reproduction. In a sexual reproduction single parent is involved and capable of producing offspring. Fission, sporulation, budding and fragmentation are the common modes of asexual reproduction seen in animals and plants. Zoospore, conidia etc are the common asexual structures formed in several algae and fungi.

In flowering plants vegetative reproduction, are natural and artificial. In natural method the development of new plant takes place under suitable environmental conditions from some organ like stem, leaf, root or even flower of the mother plant. runners, offsets, stolons and suckers are the common other natural methods of reproduction seen in angiosperms. The artificial method of propagation are cutting, layering and grafting. Sexual reproduction involves formation and fusion of gametes. it is a complex and slow process as compared to asexual reproduction. Events of sexual reproduction may be categorized into the pre-fertilization, fertilization and post-fertilization events.

Pre-fertilization events of sexual reproduction are found prior to the fusion of gametes. The two main pre-fertilization events are gametogenesis and gamete transfer. Gametes are always haploid and homogametes or heterogametes. After formation, the male and female gametes are brought together to facilitate fertilization. The fusion of two similar or dissimilar gametes is called syngamy and its result in formation of diploid zygote is formed, this process is known as fertilization. It is external or internal.

The formation of zygote and the process of development of embryo are called post fertilization events. Zygote is the vital link that ensures continuity of species between organisms of one generation and the next. Embryogenesis is the process of development of embryo from the zygote during embryogenesis zygote undergoes cell division and cell differentiation cell divisions increase the number of cells while differentiation helps group of cells to undergo certain modification to form specialized tissue and organs to form an organism.

**For the given options select the correct options (a, b, c, d) each carries one mark.**

- Which animals have developed capacity of regeneration ?  
 (a) Hydra, Starfish      (b) Plasmodium      (c) Earthworm      (d) Spongilla
- Sporulation occurs in.....  
 (a) Plasmodium      (b) Hydra      (c) Starfish      (d) Spongilla
- Which plant reproduce vegetatively by roots ?  
 (a) Oxalis      (b) Bryophyllum      (c) Onion      (d) Dahlia
- Which plant performs vegetative reproduction with the help of floral buds ?  
 (a) Agave      (b) Bryophyllum      (c) Ginger      (d) Asparagus

5. Which part of the plant bryophyllum performs vegetative reproduction ?  
 (a) Stem (b) Floral buds (c) Underground roots (d) Buds on life margin
6. What types of chromosomes are always present in gametes ?  
 (a) Haploid (b) Diploid (c) Triploid (d) Tetraploid
7. Which physiological process is necessary for birth, growth, death, production of offspring and for continuity of the species ?  
 (a) Digestion (b) Transportation (c) Reproduction (d) Nutrition
8. In which type of reproduction single parent is essential for reproduction ?  
 (a) Asexual (b) Sexual (c) Vegetative (d) Fragmentation
9. In which type of reproduction two individual of opposite sex are essential ?  
 (a) Asexual (b) Sexual (c) Vegetative (d) Fragmentation
10. In which type of organism asexual reproduction is seen ?  
 (a) Unicellular (b) Bicellular (c) Multicellular (d) Both a and c
11. How does Amoeba reproduce ?  
 (a) Binary fission (b) Budding (c) Sporulation (d) Both a and c
12. What are ciliated spore ?  
 (a) Non-motile spores (b) Zoospores (c) Homospores (d) Heterospores
13. Non-flagellate spores are called conidia ? In which organism they are seen ?  
 (a) Pencillium (b) Hydra (c) Amoeba (d) Chlamydomonas
14. Which animals reproduce by exogenous budding ?  
 (a) Hydra (b) Spongilla (c) Plasmodium (d) Amoeba
15. Which animal reproduce by multiple fission ?  
 (a) Hydra (b) Plasmodium (c) Spongilla (d) Euglena
16. In which metohd of asexual reproduction the division of cytoplasm is not possible ?  
 (a) Amitotic division (b) Binary fission (c) Division (d) Budding
17. During which process cyst is formed ?  
 (a) Binary fission (b) Multiple fission (c) Sporulation (d) Budding
18. In which method pseudopodiospores are formed ?  
 (a) Binary fission (b) Multiple fission (c) Sporulation (d) Budding
19. In which organism other than amoeba,sporulation is seen ?  
 (a) Paramoecium (b) Plasmodium (c) Hydra (d) Planaria
20. In which animal,formation of exogenous budding takes place from parent body ?  
 (a) Hydra (b) Planaria (c) Amoeba (d) Paramoecium
21. Which special method of reproduction is found on Nephrolepis ?  
 (a) Offsets (b) Stolons (c) Runner (d) Suckers
22. Which of the following is not a natural method of vegetative reproduction ?  
 (a) Suckers (b) Cutting (c) Runners (d) Offsets

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23. How many chromosomes are there in meiocyte of Apple ?  
 (a) 17                                      (b)34                                      (c) 20                                      (d)10
24. In which animal conjugation occurs as a sexual reproduction ?  
 (a)Birds                                      (b)Hydra                                      (c) Paramoecium                                      (d) Spirogyra
25. Development of zygote taking place outside the body is called ?  
 (a) Viviparous                                      (b)Oviporous                                      (c) Omnivorous                                      (d) Frugivorous
26. By which asexual reproductive method do Dictyota, Fucus and Yeast reproduces ?  
 (a) Budding                                      (b) Sporulation                                      (c) Fragmentation                                      (d) Fission
27. Which algae reproduce by fragmentation ?  
 (a) Ulothrix, Oedogonium                                      (b) Spirogyra, Zygnema  
 (c) Sargasum, Oscillatoria                                      (d) Both a and b
28. In which plants motile ciliated spores are produced during spore formation ?  
 (a) Chlamydomonas                                      (b) Spirogyra                                      (c) Dictyota                                      (d) Fucus
29. What divides first during the method of fission ?  
 (a) Cytoplasmic membrane                                      (b) Cytoplasm  
 (c) Nucleus                                      (d) Cell organelles
30. In Amoeba, the plane of cytoplasmic division is in which direction ?  
 (a) One direction                                      (b) Two direction  
 (c) Three direction                                      (d)Any direction
31. Which type of division happens in Euglena ?  
 (a) Transversal                                      (b) Longitudinal                                      (c) Peripheral                                      (d) Radial
32. Other than Euglena, which of the following organism divides by longitudinal division ?  
 (a) Amoeba                                      (b) Paramoecium                                      (c) Vorticella                                      (d) Plasmodium
33. In which method of asexual reproduction the offspring's are genetically identical, to the parents ?  
 (a) Amitotic division                                      (b) Multiple fission                                      (c) Division                                      (d) Binary fission
34. Non-motile and non-flagellate spores are commonly seen in which plants ?  
 (a) Penicillium                                      (b) Aspergillus                                      (c) Mucor                                      (d) Both a and b
35. The plants which bears only one kind of spores during Sporophytic, stage are known as .....  
 (a) Spores                                      (b) Heterosporous                                      (c) Homosporous                                      (d) Gametes
36. The plants which bears only two types of hetero spores during Sporophytic stage is known as.....  
 (a) Spores                                      (b) Somatic spores                                      (c) Homosporous                                      (d) Heterosporous
37. Which type of spores are produce by pteridophytes and gymnosperms ?  
 (a) Spores                                      (b) Somatic spores                                      (c) Heterospores                                      (d) Homospores
38. How does vegetative reproduction takes place in flowering plants ?  
 (a) Natural                                      (b) Artificial                                      (c) By chemicals                                      (d) Both a and b
39. Which of the following pair is incorrect ?  
 (a) Lawn grass-runner                                      (b) Pistia-offset  
 (c) Nephrolepis-stolons                                      (d) Sellaginella-Suckers

40. Which of the following Plant shows root cutting ?  
 (a) Sugarcane                      (b) Croton                      (c) Rose                      (d) Lemon
41. In Which plant stem is used for vegetative propagation of the plant ?  
 (a) Lemon, grapes                      (b) Hibiscus, mogra  
 (c) Sugarcane, rose                      (d) Mango, apple
42. In which of the following organism, internal bud formation is seen ?  
 (a) Amoeba, Plasmodium                      (b) Amoeba, Paramecium  
 (c) Planaria, Hydra                      (d) Spongilla, sycon
43. What are Internal buds known as ?  
 (a) Gene                      (b) Clone                      (c) Gemmules                      (d) Bud
44. Which method of asexual reproduction can be said as method of regeneration ?  
 (a) Binary fission                      (b) Sporulation                      (c) Budding                      (d) Fragmentation
45. Which of the following group of animals show regeneration ?  
 (a) Planaria, Hydra, Starfish                      (b) Starfish, Amoeba, Plasmodium  
 (c) Amoeba, Hydra, Paramoecium                      (d) Amoeba, Planaria, Starfish
46. Which asexual reproduction process is seen in bacteria?  
 (a) Budding                      (b) Sporulation                      (c) Fragmentation                      (d) Fission
47. For which plants layering method of vegetative propagation is used ?  
 (a) Lemon, Grapes                      (b) Sugarcane, Rose                      (c) Mango, Apple                      (d) Guava, Litchi
48. What do a stock have ?  
 (a) Bud                      (b) Branches  
 (c) Leaves                      (d) Possess regular or irregular roots
49. Grafting is useful for production of.....  
 (a) Agriculture                      (b) Horticulture  
 (c) For inducing flowering                      (d) Fruit yield plants
50. Which gametes take part in sexual reproduction ?  
 (a) Male gametes                      (b) Female gametes  
 (c) Neutral gametes                      (d) Both a and b
51. During which phase an living organism becomes sexually mature ?  
 (a) Childhood                      (b) Adolescence                      (c) Old age                      (d) None of these
52. In plants, the phase from germination to grow till its maturity is known as ?  
 (a) Linear growth phase                      (b) Germination phase  
 (c) Flowering phase                      (d) None of the above
53. Which phase of conjugation is impossible in gametes ?  
 (a) Post-fertilization phase                      (b) Fertilization phase  
 (c) Pre-fertilization phase                      (d) Gamete phase
54. Two gametes having similar appearance are called as.....  
 (a) Gametes                      (b) Isogametes                      (c) Heterogametes                      (d) Isospores

55. In which plants isogametes are seen?  
 (a) Cladophora (b) Ulothrix (c) Spirogyra (d) Both a and b
56. Morphologically distinct gametes are called as  
 (a) Isogametes (b) Heterogametes (c) Gametes (d) Iso-spores
57. Which organisms have diploid body organization?  
 (a) Monera and Fungi (b) Algae and Bryophyte  
 (c) Pteridophytes and Angiosperms (d) Both a and b
58. Which organisms have diploid body organization?  
 (a) Pteridophytes, angiosperms (b) Angiosperms  
 (c) Most of the animals (d) All three
59. Normally male gametes are.....  
 (a) Stationary (b) Ordinary (c) Nutritive (d) Motile
60. Normally Female gametes are....  
 (a) Stationary (b) Ordinary (c) Nutritive (d) Motile
61. By which medium gametes of Algae, Bryophytes and Pteridophytes move ?  
 (a) Air (b) Water (c) Lipids (d) Tissue
62. Which structure provides surface for the settlement of pollen grains in angiosperm plants ?  
 (a) Anther (b) Style (c) Stigma (d) Pollen tube
63. The process of transfer of pollen grains from the anther to the stigma is known as .....  
 (A) Distribution of pollen grains (b) Transportation of pollen grains  
 (c) Formation of pollen grains (d) Pollination
64. Where do pollen grains germinate ?  
 (a) Anther (b) Style (c) Stigma (d) Pollen tube
65. Which structure is produced by germination of pollen grain ?  
 (a) Pollen tube (b) Style (c) Tube (d) Vessels
66. In which organ the growth of pollen tube is observed, till it reaches the ovules ?  
 (a) Pollen tube (b) Style (c) Ovary (d) Stigma
67. Development of zygote result in formation of.....  
 (a) Seed (b) Fruit (c) Embryo (d) Seed coat
68. During conjugation, the-bridge is formed of.....  
 (a) Nucleus (b) Inter cytoplasm (c) Chromosomes (d) Cytoplasm
69. The process of organ formation start of.....  
 (a) Due to growth (b) Due to development  
 (c) Due to differentiation (d) Due to division
70. The fertilized eggs of reptile and birds are covered with calcareous shell. Due to this the zygote passes from which phase ?  
 (a) Growth phase (b) Vegetative phase  
 (c) Development phase (d) Incubation phase



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71. In Angiosperms, which parts of the flowers wither and fall off ?  
 (a) Sepals (b) Petals (c) Stamens (d) All the three
72. In Angiosperms which part of the flowers attached with plant body.  
 (a) Calyx (b) Carolla (c) Gynoecium (d) Androecium
73. In asexual reproduction embryosac develop from which part ?  
 (a) Pollengrain (b) Ovum (c) Ovary (d) Mother megaspore
74. In amorphophalus and colocasia vegetative reproduction occur by which plant organ ?  
 (a) Tuber stem (b) Bubil (c) Corm (d) Offsets
75. What is the eye of potato ?  
 (a) Root (b) Stem (c) Bud (d) Flower
76. Which type of vegetative reproduction occurs in Grape and Hibiscus ?  
 (a) Cutting (b) Layering (c) By seed (d) Grafting
77. Find out mismatched from the following.  
 (a) Lawn grass-runner (b) Mango-Grafting  
 (c) Lemon-by embryo grafting (d) Bamboo-Grafting
78. Which one is the best ?  
 (a) Stock (b) Scion (c) Cutting (d) All a, b, c
79. Which method is used for vegetative reproduction the devlopment of banana plant ?  
 (a) Cutting (b) Layering (c) Grafting (d) Bud Grafting
80. Which organism becomes reproductive due to deficiency of mitosis and meiosis ?  
 (a) Dog (b) Ameoba (c) Grasshopper (d) Earthworm
81. In wich circumstances psuedopodial spore are produced ?  
 (a) Normal (b) Favourable (c) Unfavourable (d) Specific condition
82. Which asexual reproduction three layered encysts develop ?  
 (a) Binary fission (b) multiple fission (c) Sporulation (d) Fragmentation
83. Which type of asexual reproduction takes place in sycon and spongilla ?  
 (a) Exo budding (b) Endo budding (c) Fragmentation (d) Division
84. Asexual reproduction takes place by which method in dictyota and fucus ?  
 (a) By Bud method (b) By Binary fission  
 (c) By Multiple fission (d) By Fragmentation
85. Flagellated spore is known as \_\_\_\_\_.  
 (a) Non-flaglleted spore (b) Motile spore (c) spore (d) Hetero spore
86. Conidia spore is known as \_\_\_\_\_  
 (a) Motile spore (b) Non-flaglleted spore (c) spore (d) Hetero spore
87. In which reproductive system plants, Animals & Fungi or differentiated morphologically, histologically, and physiologically ?  
 (a) Asexual (b) Sexual (c) Vegetative (d) Artificial reproduction

88. Which are the various stages of sexual reproduction ?  
 (a) Growth, Development, Diffrentiation.  
 (b) Pre fertilization, Fertilization, Post fertilization.  
 (c) Fertilization, Post Fertilization, Pre Fertilization.  
 (d) Gametogenesis, Gamete transfer, Gamete Fertilization.
89. How many chromosome number are seen in Onion and Housefly during meiosis ?  
 (a) 32,12                              (b) 16,12                              (c) 16,06                              (d) 32,06
90. In which development of zygote takes place in female is called as..... in animals.  
 (a) Oviparous                              (b) Viviparous                              (c) Ovoviviparous (d) None

**A-R types of MCQ**

- a. A is true and R is false.  
 b. A is false and R is true  
 c. A and R both are true and R is correct explanation of A.  
 d. A and R both are true but R is not correct explatation of A.
91. A: In specific plant structure rhizome, tuber, corm, bulbil are the strange sexual reproductive system  
 R: These are the commen vegetative reproduction in monocotyldon family  
 (a)              (b)              (c)              (d)
92. A: Gametes are synthesied independently by haploid or diploid parent which is Euploid.  
 R: Euploid is very commen in plant nature.  
 (a)              (b)              (c)              (d)
93. A: The main function of stem is reproduction.  
 R: Stem contains(possess) leaves which produce food for plant.  
 (a)              (b)              (c)              (d)
94. A: Corn is a condensed rhizome.  
 R: Ginger is a arhizome.  
 (a)              (b)              (c)              (d)
95. A: Hydra possess exogenous budding method.  
 R: Exogenous bud devlops in hydra which directs asexually reproduction.  
 (a)              (b)              (c)              (d)
96. A: Encystation is a structure which is hard three layered cyst.  
 R: Procaryotes are protected in specific stage its life cycle by encysation.  
 (a)              (b)              (c)              (d)
97. A: Ginger is a stem.  
 R: Node, bud, adventitious root, scaly leaf are seen on the ginger.  
 (a)              (b)              (c)              (d)
98. A: Grafting is most helpful method.  
 R: scion contain desirable characters in the grafting method so a plant possessing higher characters.  
 (a)              (b)              (c)              (d)

99. A: Juvenile phase possess plant growth.  
 R: after this phase plant is ready for pre fertilization phase.  
 (a)            (b)            (c)            (d)

**Column types Question.**

100. Match the appropriate pairs.

**Column - I**

- (P) Binary fission  
 (Q) Multiple fission  
 (R) Sporulation  
 (S) Budding  
 (a) P-iii, Q-i, R-iv, S-ii  
 (b) P-i, Q-ii, R-iii, S-iv  
 (c) P-iv, Q-iii, R-ii, S-i  
 (d) P-ii, Q-iii, R-iv, S-i

**Column - II**

- (i) Paramoecium  
 (ii) Hydra  
 (iii) Amoeba  
 (iv) Plasmodium

101. Match the appropriate pairs.

**Column - I**

- (P) Binary fission  
 (Q) Transverse binary fission  
 (R) Longitudinal  
 (S) Budding  
 (a) P-i, Q-ii, R-iii, S-iv  
 (b) P-iv, Q-i, R-ii, S-iii  
 (c) P-iv, Q-ii, R-iii, S-i  
 (d) P-iii, Q-iv, R-i, S-ii

**Column - II**

- (i) Paramoecium  
 (ii) Euglena  
 (iii) Hydra  
 (iv) Ameoba

102. Match the appropriate pairs.

**Column - I**

- (P) Fission  
 (Q) Budding  
 (R) Fragmentation  
 (S) Sporulation  
 (a) P-i, Q-ii, R-iii, S-iv  
 (b) P-ii, Q-iii, R-iv, S-i  
 (c) P-iii, Q-iv, R-i, S-ii  
 (d) P-iii, Q-i, R-ii, S-iv

**Column - II**

- (i) Ulothrix, Saprolegnia  
 (ii) Oedogonium, Chlamydomonas  
 (iii) Algal, Fungi, Monera  
 (iv) Dictyota, Fucus, Protosiphon

103. Match the appropriate pairs.

**Column - I**

- (P) Dahlia
- (Q) Turmeric
- (R) Bryophyllum
- (S) Oxalis
- (T) Discoria

**Column - II**

- (i) Axillary bud
- (ii) Buds on the margin of leaf
- (iii) Floral bud
- (iv) Rhizome
- (v) Cluster of tuberous root

- (a) P-i, Q-ii, R-iii, S-iv, T-v
- (b) P-v, Q-iv, R-iii, S-ii, T-i
- (c) P-ii, Q-iii, R-iv, S-v, T-i
- (d) P-v, Q-iv, R-ii, S-iii, T-i

104. Match the appropriate pairs.

**Column - I**

- (P) Terminalia
- (Q) Rose
- (R) Hibiscus
- (S) Mango

**Column - II**

- (i) Layerings
- (ii) Root cutting
- (iii) Grafting
- (iv) Stem cutting

- (a) P-i, Q-ii, R-iii, S-iv
- (b) P-iv, Q-iii, R-ii, S-i
- (c) P-ii, Q-iv, R-i, S-iii
- (d) P-ii, Q-iv, R-iii, S-i

105. Match appropriate pairs.

**Column - I**

- (P) Juvenile phase
- (Q) Gametogenesis phase
- (R) Gamete transfer phase
- (S) Fertile phase

**Column - II**

- (i) Cell produced during meiosis
- (ii) Conjugation phase of heterogenous meiotic cells
- (iii) Phase during which specific maturation occurs
- (iv) The phase during which heterogenous meiotic division occur

- (a) P-i, Q-ii, R-iii, S-iv
- (b) P-iii, Q-i, R-iv, S-ii
- (c) P-ii, Q-iii, R-iv, S-i
- (d) P-iii, Q-i, R-ii, S-iv

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106. Match the appropriate pairs.

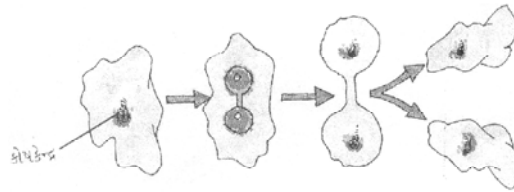
**Column - I**

- (P) Gametogenesis
- (Q) Transfer of gamete
- (R) Pollination
- (S) Fertilization
- (a) P-iv, Q-i, R-ii, S-iii
- (c) P-ii, Q-iii, R-iv, S-i

**Column - II**

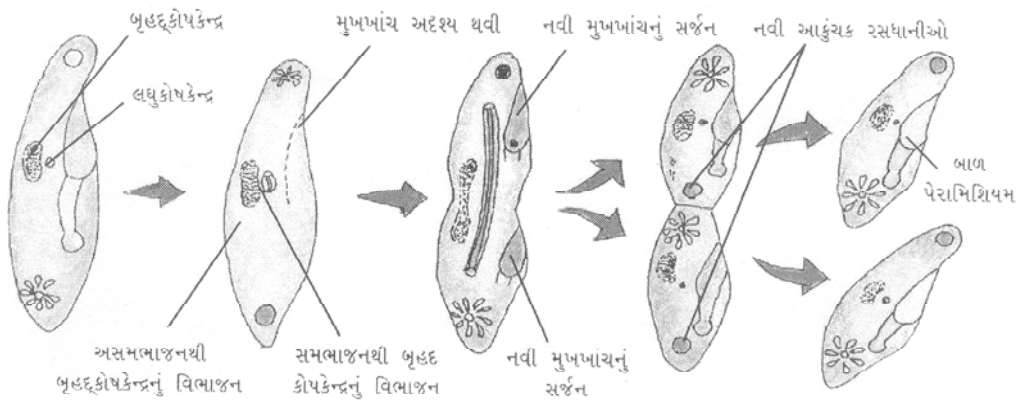
- (i) The process of transfer of gametes
- (ii) Transfer of pollen by self or carrier in a angiosperms
- (iii) Two heterogenous gametes conjugate to form zygote
- (iv) Formation of gametes
- (b) P-i, Q-ii, R-iii, S-iv
- (d) P-iv, Q-iii, R-iv, S-ii

107. In a given figure which part is correct ?



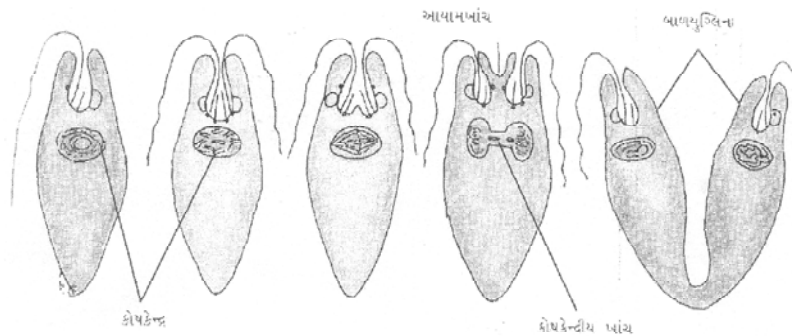
- (a) Nucleus
- (b) Cytoplasm
- (c) Cell membrane
- (d) All (a, b, c)

108. In a given figure which type of asexual reproduction take place ?



- (a) Fission
- (b) Binary fission
- (c) Transverse binary fission
- (d) Longitudinal binary fission

109. In a given figure which type of asexual reproduction take place ?

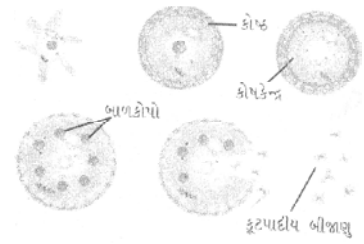


- (a) Fission
- (b) Binary fission
- (c) Transverse binary fission
- (d) Longitudinal binary fission

Questionbank Biology

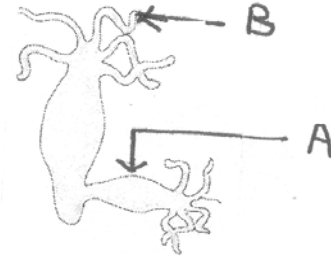
110. Which type of reproduction is shown in following figure ?

- (a) Fission
- (b) Binary fission
- (c) Multiple fission
- (d) Sporulation



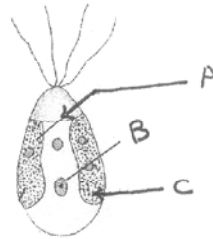
111. In following figure identify and give the correct names of types of reproduction and 'A' and 'B'.

- (a) Asexual reproduction; A-bud, B-Tentacle
- (b) Binary fission ; A-bud, B-Tentacle
- (c) Multiple fission ; A-bud, B-Tentacle
- (d) Budding fission ; A-bud, B-Tentacle



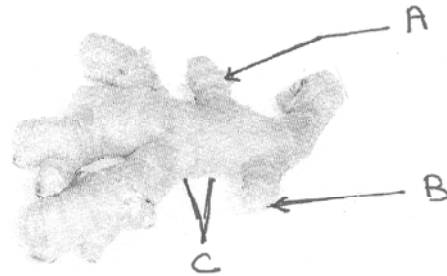
112. Identify A, B and C in the following figure.

- (a) A-nucleus, B-chloroplast, C-Pyrenoids
- (b) A-chloroplast, B-pyrenoid, C- nucleus
- (c) A-pyrenoid ,B-nucleus,C-chloroplast
- (d) A-chloroplast,B-nucleus,C-mitochondria

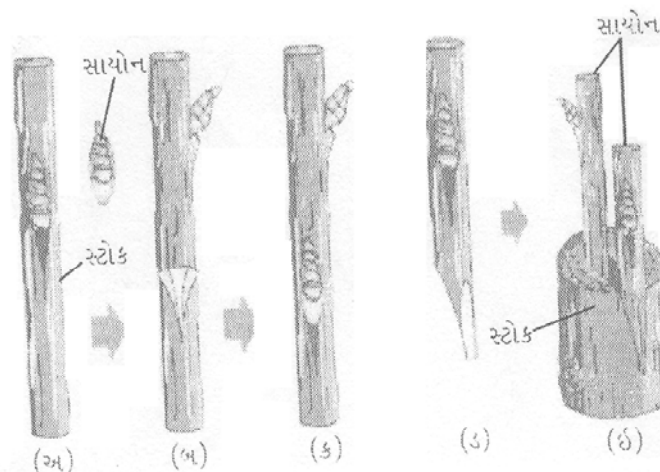


113. Identify A,B and C in the following figure.

- (a) A-node,B-bud,C-adventitious root
- (b) A-bud,B-node,C-adventitious root
- (c) A-adventitious root,B-node,C-bud
- (d) A-node,B-adventitious root,C-bud



114. Find out the correct sequence from the given figure.



- (a) Bud grafting, grafting, crown grafting, tongue grafting, side grafting
- (b) Bud grafting, side grafting, tongue grafting, wedge grafting, crown grafting
- (c) Crown grafting, wedge grafting, tongue grafting, side grafting, bud grafting
- (d) Bud grafting, side grafting, scion grafting, stock grafting

**Competitive Exam's MCQ**

115. The production of new plant from the maternal plant is called. **(CPMT=2003)**  
 (a) Vegetative reproduction (b) Cutting  
 (c) Grafting (d) Layering
116. Which of the following plant reproduces by leaf ? **(DPMT-2003)**  
 (a) Agave (b) Bryophyllum  
 (c) Gladiolus (d) Potato
117. Pollen tube enters the embryo sac through **(AIIMS-2004)**  
 (a) Any one synergid cell  
 (b) Directly penetrating the egg cell  
 (c) In between one synergid cell and secondary nucleus.  
 (d) The help of antipodal cells.
118. Grafting is impossible in monocot-because **(UTTRANCHAL PMT-2004)**  
 (a) Vascular bundles are scattered. (b) Meristem is absent  
 (c) Collateral open vascular bundle (d) Radial vascular bundle.
119. If vegetative growth of the plant takes place but flower production does not occur-then what could be the reason for this?  
 (a) Imbalance of hormones (b) Photoperiod  
 (c) Imbalance of sugar in water (d) Irregular transport of solute.
120. What is the name of the technique for the production of large number of top?  
 (a) Top production (b) Organo genesis  
 (c) Micro culture (d) Embryo culture
121. Where does the culture of haploid pollen grain is useful in plant breeding?  
 (a) For production of better hybrid  
 (b) For production of homogametic organisms.  
 (c) For production of disease causing organisms  
 (d) None of this
122. Haploid plants are obtained by culture of-  
 (a) Young leaves (b) Endosperm (c) Pollen grain (d) Root apex
123. Which of the following is associated with vegetative reproduction?  
 (a) Combination of pre existing cytoplasm.  
 (b) Tissue culture  
 (c) Endo static fertilization  
 (d) (a) and (b) Both.
124. With the help of which quick cell division could be induced?  
 (a) By T1 plasmid (b) PBR-32 (c) F-speed (d) By sexual plasmid

125. Which auxin is used in callus and suspension culture technique in general?  
 (a) Naphthelene acetic acid (b) 2-4 Dichloro acetic acid  
 (c) 2,4,5, Tri phenoxy acetic acid (d) 2,4 dichloro phenoxy acetic acid.
126. Which of the following animal shows longitudinal binary fission?  
 (a) Englena (b) Plasmodium (c) Planaria (d) Paramoecium
127. Identify the mis-match statement regarding post fertilization events from the following statements.  
 (a) Wall of ovary is converted in to pericarp.  
 (b) Outer integument is converted in inner integument  
 (c) Triploid nucleus develops as endosperm  
 (d) Ovary is developed as fruit.
128. In cryptogamic tracheophyte's prothallus the male gamate and an egg are produceed at different time.the reason for this is-  
 (a) Because they possess higher sterility  
 (b) They are produced from cells which are meiotically formed.  
 (c) Because they does not allow self fertilization.  
 (d) Because there is no change in their successful fertilization rate.
129. What type of fruit will be produced by fixing the stock of sour juice producing branch on scion of plant having sweet branch?  
 (a) Sweet and fibrous (b) Sweet and juicy  
 (c) Sour and juicy (d) Sour and fibrous
130. How man eggs will be formed from an ovary of a woman,in absence implantation of an embryo?  
 (a) 12 (b) 06 (c) 24 (d) 48
131. Which tissue is required to be present in between stock and scion during grafting?  
 (a) Xylem (b) Phloem (c) Meristem (d) Parenchyma.
132. Where does maturity is observed in the sporophytic stage of the plants?  
 (a) In gemina (b) In primay structures  
 (c) In sporophylls (d) In eggs.
133. If primary spermetocyte have  $2n=16$  chromosomes during first meiotic division,in such case how many chromatids could be present in each secondary spermatocyte?  
 (a) 32 (b) 8 (c) 16 (d) 24



**ANSWER KEY**

1	a	34	d	67	c	100	a	133	b
2	a	35	c	68	d	101	b		
3	d	36	d	69	c	102	c		
4	a	37	c	70	d	103	d		
5	d	38	d	71	d	104	c		
6	a	39	d	72	c	105	b		
7	c	40	d	73	d	106	a		
8	a	41	c	74	c	107	c		
9	b	42	d	75	c	108	c		
10	d	43	c	76	b	109	d		
11	d	44	d	77	d	110	d		
12	b	45	a	78	d	111	d		
13	a	46	d	79	a	112	c		
14	a	47	a	80	b	113	a		
15	b	48	d	81	c	114	b		
16	a	49	d	82	c	115	a		
17	c	50	d	83	b	116	b		
18	c	51	b	84	a	117	a		
19	b	52	a	85	b	118	b		
20	a	53	d	86	b	119	b		
21	b	54	b	87	b	120	b		
22	b	55	d	88	b	121	c		
23	a	56	b	89	c	122	b		
24	c	57	d	90	b	123	c		
25	b	58	d	91	d	124	b		
26	a	59	d	92	b	125	a		
27	d	60	a	93	b	126	d		
28	a	61	b	94	d	127	a		
29	c	62	c	95	c	128	b		
30	d	63	d	96	c	129	c		
31	b	64	c	97	c	130	b		
32	c	65	a	98	c	131	b		
33	d	66	b	99	d	132	b		



## Unit -VI

### Chapter-2. Sexual Reproduction in Flowering Plants

#### IMPORTANT POINTS

Reproduction is the most important feature of living organisms.

It is a process of producing offspring, ie., the next generation, which is a means of self-perpetuation.

In sexual reproduction, fusion of male and female gametes takes place.

Flowers are reproductive organs of plants.

A typical flower has four whorls – From the outer side

calyx	}	outer two, which are sterile
corolla		

Androecium	}	Inner two, which are fertile
Gynoecium		

stamens are actually microsporophylls. It is a male reproductive part. It has three parts (1) Anther (2) connective and (3) Filament.

Anther is bilobed structure having four microsporangia.

It's wall has four layers (i) Epidermis (ii) Endothecium (iii) middle layers and (iv) Tapetum.

Microsporangium at the centre possesses sporogenous tissue.

The sporogenous tissue by meiotic division produces large number of microspore tetrads.

Each microspore matures to form pollen grain.

Pollen wall is two layered. (i) Exine – outer hand layer (ii) Intine – Inner thin layer.

Exine has prominent apertures called Germ pores, at which place sporopollenin is absent.

Intine develops as a pollen tube and comes out of germ pores.

During further development of male gametophyte, the pollen nucleus divides to form (1) vegetative cell / nucleus and (2) Generative cell / nucleus. Vegetative nucleus disintegrates later on and the generative nucleus divides to produces two male gametes.

A Gynoecium (pistil) is like megasporophyll.

It is female reproductive part.

It has three region (i) Stigma (ii) Style (iii) Ovary.

Ovule (megasprangium) is developed from the placenta inside the ovarium cavity.

The stalk of the ovule is called funicle. Ovule is covered by one or two integuments; leaving a small opening called micropyle.

Only one megaspore mother cell located towards micropylar divides meiotically to form four haploid megaspore arranged linearly called linear tetrad.

Of the four only one becomes functional. It forms female gametophyte (Embryo sac)

The mature embryo sac is 7 celled; but 8 nucleated.

Here 3 nuclei get organized into an egg-apparatus, which consist of 1 egg cell and two synergids, toward micropylar end.

While towards chalazal end, three nuclei get organized to form antipodal cells.

From each end one nuclei each comes in the middle, unite to form one cell, called secondary nucleus, which has two nuclei.

Pollination -

The process of transfer of pollen grain from the anther to the stigma is called pollination.

Pollination are of two types (1) self and (2) cross.

Self-pollination can occur in bisexual as well as unisexual flowers while cross pollination is possible only in unisexual flowers naturally.

Homogamy and cleistogamy are the adaptations for self-pollination while Dichogamy is for self-sterility.

Hetrostyled is for cross pollination.

Different pollinating agents are

(a) Abiotic - (i) wind and (ii) water.

(b) Biotic animals like , Insects, birds etc.

pollen – pistil interaction involves all events from landing of pollen grains to the stigma until the pollen tube enters the embryo sac.

Following compatible pollination, pollen grain germinates on the stigma and the pollen tube grows through the style, enters the ovules and finally discharges two male gametes through one of the synergids.

Angiosperm exhibit double fertilization in which fusion occur in at two places in the embryo sac. Egg follows syngamy to form zygote and secondary nucleus forms endosperm nucleus by triple fusion.

Zygote (2n) develops into the embryo and the primary endosperm nucleus forms the endosperm.

These are called post – fertilization events.

The division during the development of endosperm may occur in a different manner and result in the production of nuclear or cellular or helobial type of endosperm.

The developing embryo passes through different stages like – pro – embryo, globular and heart shaped stage to form final structure.

Mature dicot embryo has (i) Two cotyledons and (ii) an Embryonal axis with (a) Epicotyl and (b) Hypocotyl.

Embryo of monocot possesses only one cotyledon.

During this ovary develops into fruit and ovules develop as seeds.

1. Plant embryo develops from.  
 (a) seed                      (b) Fruit                      (c) Zygote                      (d) Flower
2. Embryo of flowering plant is always -  
 (a) Haploid (n)      (b) Diploid (2n)      (c) Triploid (3n)      (d) Tetraploid (4n)

3. Plant embryo is a mass of -  
 (a) cells (b) Uncertain tissue  
 (c) Collection of plant tissues (d) Miniature plant
4. Stamen is a modification of  
 (a) Leaf (b) Microsporophyll (c) Megasporophyll (d) Shoot
5. Zygote is formed inside the  
 (a) Stigma (b) Style (c) Female gametophyte (d) Seed
6. A microspore is a  
 (a) Male gamete (b) First cell of male gametophyte  
 (c) Last cell of male gametophyte (d) Diploid cell
7. An anther consists of  
 (a) one microsporangium (b) four microsporangia  
 (c) Two microsporangia (d) many microsporangia
8. Cells of nucellus are always  
 (a) Haploid (b) Triploid (c) Diploid (d) Enucleated
9. The embryo sac is produced from  
 (a) Microspore (b) Zygote (c) Egg cell (d) Megaspore
10. An egg-apparatus contains  
 (a) An egg + two antipodals (b) An egg + Secondary nucleus  
 (c) An egg + Two synergids (d) Antipodal cell + synergid
11. In angiosperm the endosperm nucleus is  
 (a) Triploid (b) Diploid (c) Tetraploid (d) Haploid
12. Female gametophyte is also known as  
 (a) ovule (b) egg-apparatus (c) Nucellus (d) Embryo sac
13. Embryo sac contains  
 (a) 3 eggs (b) 2 eggs (c) 1 egg (d) 4 eggs
14. Carpel is formed of  
 (a) Two part (b) Three part (c) Four part (d) Seven part
15. The arrangement of flowers on the floral axis is known as  
 (a) Venation (b) Phyllotaxy (c) Anthology (d) Aestivation
16. The unit of female reproductive body in flower is  
 (a) Carpel (b) Megasporangium (c) Ovule (d) Ovary
17. After fertilization the ovule develops into  
 (a) Endosperm (b) seed (c) Embryo sac (d) Fruit
18. Fruit is a modification of  
 (a) Female gametophyte (b) ovary (c) carpel (d) Nucellus
19. The seed coat develops from  
 (a) Embryo sac (b) Inner integument (c) Nucellus (d) Outer integument

20. Nucellus in seed is represented by  
 (a) Testa            (b) Pericarp        (c) Tegmen            (d) Seed Coat
21. Pollen grain are produced in  
 (a) Nucellus        (b) Stigma            (c) Anther            (d) Chalaza
22. Ovule is attached to the placenta by  
 (a) pedicel        (b) Hilum            (c) Funicle            (d) petiole
23. Pollen tube enters the embryo sac through  
 (a) Integument    (b) Micropyle        (c) chalaza            (d) Funicle
24. Pollen tube, entering in embryo sac has  
 (a) 3 male gametes    (b) 1 male gametes    (c) 2 male gametes    (d) 4 male gametes
25. In flowering plants, fertilization occur in  
 (a) Ovary            (b) Embryo sac        (c) Nucellus            (d) Ovule
26. The formation of zygote without the act of syngamy is called  
 (a) Poly embryony (b) Parthenogenesis    (c) Budding            (d) Apospory
27. Which phase of life cycle is dominant in the individuals of angiosperms ?  
 (a) Gametophyte    (b) Growth phase    (c) Sporophyte        (d) Development phase
28. The process by which seedless fruits are produced are known as  
 (a) Parthenocarpy (b) Apogamy            (c) Parthenogenesis    (d) Apospory
29. A flower is  
 (a) Modified stem (b) Modified leaf    (c) Modified branch    (d) Modified shoot
30. A flower is specially formed for  
 (a) decoration        (b) photosynthesis (c) reproduction        (d) fragrance
31. Pollen tube enters the micropyle into through  
 (a) Female gamete (b) Ovary            (c) Female gametophyte (d) Nucellus
32. Embryo develops from  
 (a) Egg cell            (b) Zygote            (c) Egg-apparatus        (d) Synergids
33. Fertilized secondary nucleus develops into  
 (a) Fruit            (b) Embryo            (c) seed                (d) Endosperm
34. Transfer of pollen to the stigma is called  
 (a) Fertilization    (b) Germination    (c) pollination        (d) Gametogenesis
35. In ficus pollination occurs through  
 (a) Water            (b) Air                (c) Bat                (d) Insects
36. After fertilization seed is developed from  
 (a) Embryo            (b) Embryo sac        (c) Ovule                (d) Zygote
37. Cross pollination is normally  
 (a) not beneficial    (b) harmful            (c) more beneficial    (d) rarely seen
38. Pollen grains germinate on  
 (a) Any surface    (b) Stigma            (c) soil                (d) Ovule

39. An anther is also called  
 (a) Sporangium (b) Megasporangium (c) Microsporangium (d) Stamen
40. The source of food for developing embryo is  
 (a) Nucellus (b) Ovule (c) Endosperm (d) Anther
41. Out of megaspore tetrad, the functional megaspore is  
 (a) Any megaspore (b) middle megaspore  
 (c) Micropylar megaspore (d) Chalazal megaspore
42. Micropylar end lacks  
 (a) Egg cell (b) Synergids (c) Egg-apparatus (d) Integument
43. The larger cell of a pollen grain with irregular shaped nucleus is  
 (a) Apical cell (b) Generative cell (c) Vegetative cell (d) Basal cell
44. How many megaspore mother cells are produced in a nucellus ?  
 (a) 3 (b) 1 (c) 2 (d) 4
45. How many cells are formed in a mature female gametophyte ?  
 (a) Eight (b) Six (c) Two (d) Seven
46. Transfer of a pollen grain to the stigma of the same plant is called  
 (a) Autogamy (b) Geitonogamy (c) Allogamy (d) Homogamy
47. The uppermost and largest cell of the suspensor which remains in contact with apical cells is called  
 (a) Hypocotyl (b) Basal cell (c) Hypophysis (d) Terminal cell
48. The adaptation for self-pollination is  
 (a) Herkogamy (b) Cleistogamy (c) Dichogamy (d) Homogamy
49. Which of the following cell is diploid?  
 (a) Synergid (b) Antipodal cell (c) Secondary nucleus (d) Egg cell
50. Suspensor is produced from  
 (a) Apical cell (b) Small upper basal cell (c) large lower basal cell (d) Hypophysis
51. Which structure pushes the developing embryo toward endosperm to get nutrition ?  
 (a) Hypophysis (b) Terminal octant (c) Proembryo (d) Suspensor
52. Development of male gametophyte begins  
 (a) After pollination (b) Before pollination (c) On the stigma (d) In the embryo sac
53. 2 to 3 celled male gametophyte, starts its further development after pollination  
 (a) In the style (b) In the ovary (c) on the stigma (d) In the ovule
54. Which part of the male gametophyte, disintegrates before fertilization ?  
 (a) Generative nucleus (b) Tube nucleus (c) Male gamete (d) Germ pore
55. Which of the following is the basal part of ovule ?  
 (a) placenta (b) Hilum (c) Micropyle (d) chalaza
56. In dicot embryogenesis, the first division in zygote is generally  
 (a) oblique (b) longitudinal (c) Transverse (d) uncertain

57. Two male gametes are  
 (a) produced before pollination (b) Haploid  
 (c) Diploid (d) At the time of pollination
58. The innermost layer of the wall of microsporangium is called  
 (a) Endothecium (b) Endodermis (c) Tapetum (d) Intine
59. Pollen grains represent  
 (a) The future sporophyte (b) The sporophyte  
 (c) The gametophyte (d) The male gametophyte
60. Tapetum provides  
 (a) protection to embryo (b) Nourishment to pollen grains  
 (c) Nourishment to embryo (d) Protection to endosperm
61. In triple fusion, how many male gamete participate ?  
 (a) 1 (b) 2 (c) 3 (d) 4
62. Germ pores are actually  
 (a) Apertures in intine (b) Thick area in intine  
 (c) Apertures in exine (d) Thin area in intine
63. Radicle tip is derived from  
 (a) Suspensor (b) Proembryo (c) Basal cell (d) Hypophysis
64. How many haploid nuclei are involved in double fertilization ?  
 (a) Four (b) Two (c) Five (d) Three
65. Endothecium in anther helps in  
 (a) Dehiscence of anther (b) Nutrition to pollen  
 (c) Germination of pollen (d) Formation of male gamete
66. The intine of a pollen grain is made up of  
 (a) Lignin and suberin (b) Pectin and cellulose  
 (c) Lignin and Hemicellulose (d) Pectin and callose
67. Which is the most resistant natural organic material ?  
 (a) Cellulose (b) Pectin (c) Suberin (d) Sporopollenin
68. Style is  
 (a) a delicate hollow tube (b) a tough hollow tube  
 (c) a delicate filament (d) called pollen tube
69. Nucellus is mass of  
 (a) Parenchymatous tissue (b) Sclerenchymatous tissue  
 (c) Meristematic tissue (d) Collenchymatous tissue
70. Which one of the following is the example of mitosis ?  
 (a) Megasporogenesis (b) Microsporogenesis  
 (c) Pollen formation (d) Division of generative cell

71. Typical anther normally consists of  
 (a) One lobe Four sporangia (b) Two lobe Two sporangia  
 (c) Two lobe Four sporangia (d) One lobe Two sporangia
72. During the development of monosporic development of embryo sac the nucleus of the functional megaspore divides  
 (a) Two times (b) Three times (c) One time (d) Repeatedly
73. Cross pollination has an advantage of  
 (a) Mutation (b) polyploidy formation (c) Genetic recombination (d) Crossing over
74. Unisexual flowers prevent  
 (a) Pollination (b) Breeding (c) Self-pollination (d) Cross fertilization
75. The function of the filiform apparatus is  
 (a) To nourish the pollen grain (b) To guide the entry of pollen tube  
 (c) To develop pollen tube (d) To carry pollen tube through style
76. Which one of the following is an example of free-nuclear endosperm  
 (a) Coconut water (b) Castor (c) Sugarcane juice (d) Groundnut
77. The protective cover of the radicle in maize seed is called  
 (a) Micorhiza (b) Coleptile (c) Scutelum (d) Coleorhiza
78. In angiosperm the endosperm is formed  
 (a) In the nucellus (b) In the embryo sac (c) In the seed (d) In the anther
79. Stamen show homology with  
 (a) Gametophyte (b) male cone (c) Microsporophyll (d) Sporangium
80. The pedicel of the female flower coils after pollination in  
 (a) Lotus (b) Hydrilla (c) Vallisneria (d) Trapa
81. The arrangement of the  $\rho$  haploid nuclei in the normal dicot embryo sac is  
 (a) 2 + 3 + 3 (b) 2 + 3 + 2 (c) 3 + 3 + 2 (d) 3 + 2 + 3
82. In the flowering plants, male and female gametes both are  
 (a) Motile (b) Non-motile (c) Diploid (d) Very large
83. Wind pollination requires that the pollen grains are  
 (a) Heavy and wet (b) Heavy and non-sticky (c) Light and dry (d) Heavy and sticky
84. Future sporophytic generation in a seed is  
 (a) Cotyledon (b) Endosperm (c) Hypocotyl (d) Embryo
85. Scatelum is  
 (a) an endosperm (b) a seed coat (c) an embryo (d) a cotyledon
86. Which one of the following floats in the cytoplasm of the vegetative cell ?  
 (a) Male gamete (b) Generatic cell (c) Female gamete (d) Microspore
87. The mature pollen grain contains  
 (a) 3 cells (b) 7 cells (c) 2 cells (d) 1 cell



88. Pollen tube is formed by  
 (a) Germ pore (b) Exine (c) Style (d) Intine
89. A single ovule produces  
 (a) 3 female gamete (b) 1 female gamete (c) 2 female gamete (d) 4 female gamete
90. Embryo sac is formed inside  
 (a) Seed (b) Endosperm (c) Embryo (d) Ovule
91. Pro-embryo is a  
 (a) 8 celled structure (b) 4 celled structure  
 (c) 2 celled structure (d) 16 celled structure
92. Suspensor is made up of  
 (a) 2 to 4 cells (b) 4 to 8 cells (c) 8 to 16 cells (d) 20 to 25 cells
93. Root cap of the embryo develops from  
 (a) Basal cell (b) Apical cell (c) Hypophysis (d) Hypocotyl
94. The hilum of the ovule represents the junction between  
 (a) Nucellus and Embryo (b) Nucellus and Integuments  
 (c) Funicle and Integuments (d) Funicle and ovule
95. Which layer of the wall of microsporangium is made up of Fibrous layer  
 (a) Middle layer (b) Endothecium (c) Tapetum (d) Epidermis
96. Out of the four sets of appendages of a typical flower the outer two sets are  
 (a) Fertile (b) Reproductive (c) Sterile (d) Filamentous
97. A proximal sterile part of the stamen is called  
 (a) Style (b) Connective (c) Anther (d) Filament
98. A sterile region present between stigma and ovary is called  
 (a) Pollen tube (b) Style (c) Filament (d) Suspensor
99. The opposite end of the micropylar region of an ovule is called  
 (a) Embryo sac (b) Nucellus (c) Chalaza (d) Thalamus
100. When pollen grains are not transferred from anthers to stigma in a flower, due to the physical barrier, it is called  
 (a) Cleistogamy (b) Herkogamy (c) Dichogamy (d) Heterogamy
101. The asexual production of seed is called  
 (a) Fragmentation (b) Apomixis (c) Self-fertilization (d) Dormancy
102. Perisperm is  
 (a) Peripheral part of endosperm (b) Remnent of endosperm  
 (c) Disintegrated secondary nucleus (d) persistant of nucleus
103. The root cell of wheat plant has 42 chromosomes. What would be the number of chromosomes in the synergid cell ?  
 (a) 21 (b) 7 (c) 28 (d) 14

104. The plant part which consist of two generations, one within the other, is  
(a) Germinated pollen grain                      (b) Embryo  
(c) Unfertilized ovule                              (d) Seed
105. The pollen tube usually enters the female gametophyte  
(a) through one of the synergids                      (b) by directly penetrating the egg  
(c) between one synergid and central cell                      (d) by knocking off the antipodal cell

**A-R types of MCQ**

106. A : In apomixis, the plants of new genetic sequence are produced  
R : In apomixis, two individuals of same genetic meet  
(a)                      (b)                      (c)                      (d)
107. A : Megaspore mother cell undergoes mitosis to produce 4 megaspores  
R : Megaspore mother cell and the megaspores are both haploid  
(a)                      (b)                      (c)                      (d)
108. A : Insects flowers to gather honey  
B : Attraction of flowers prevents the insects from damaging other parts of the plants.  
(a)                      (b)                      (c)                      (d)

**ANSWER KEY**

1	c	28	a	55	d	82	b
2	b	29	d	56	c	83	c
3	d	30	c	57	b	84	d
4	b	31	c	58	c	85	d
5	c	32	b	59	d	86	b
6	b	33	d	60	b	87	c
7	b	34	c	61	a	88	d
8	c	35	d	62	c	89	b
9	d	36	c	63	d	90	d
10	c	37	c	64	c	91	b
11	a	38	b	65	a	92	d
12	d	39	c	66	b	93	c
13	c	40	c	67	d	94	d
14	b	41	d	68	c	95	b
15	c	42	d	69	a	96	c
16	a	43	c	70	b	97	d
17	b	44	b	71	c	98	b
18	b	45	d	72	b	99	c
19	d	46	b	73	c	100	b
20	b	47	c	74	c	101	b
21	c	48	b	75	b	102	d
22	c	49	c	76	a	103	a
23	b	50	b	77	d	104	c
24	c	51	d	78	b	105	a
25	b	52	b	79	c	106	d
26	b	53	c	80	c	107	d
27	c	54	b	81	b	108	d



## Unit-VI

### Chapter-3. Human Reproduction

#### IMPORTANT POINTS

The human is unisexual and viviparous. Reproduction is the mechanism by which continuation of generation is sustained. Like all other vertebrates human also exhibits sexual dimorphism. The male and female reproductive systems are organized by several types of organs. The organs of the male reproductive system are one pair of testes, one pair of epididymis, one pair of vas deferens, one pair of seminal vesicles, prostate gland, bulbourethral gland, urethra and penis. Female reproductive system consists of one pair of ovaries, the uterine tubes, uterus, vagina, external genitalia and mammary glands.

To produce gametes, gametogenesis occurs in both male and female. The male gamete is known as sperm and female gamete is known as ovum. The process of sperm production is known as spermatogenesis and ovum production is known as oogenesis.

Menstrual cycle is the events of the cyclic changes in the endometrium, which it goes through month after month as it responds to changes in the levels of female sex hormones in the blood.

The one sperm and one ovum become involved in fertilization. A diploid zygote nucleus is formed through the fusion of male and female pronucleus. Now fertilized ovum is called zygote. During movement of zygote into oviduct cleavage occurs. The embryo with 16 cells is called morula. Now the process of implantation of embryo takes place.

The period of development of young one in female reproductive system is known as pregnancy. It takes approximately 266 to 280 days. The process of child birth is called parturition. The mammary glands of the mother undergo differentiation during pregnancy and start producing milk after delivery. This process is called lactation.

#### M.C.Q.

1. Which of the following character is seen in female ?
 

(a) Muscles are strong	(b) Mammary gland is well developed
(c) Voice is heavy	(d) Mammary gland is namesake only
2. Which of the following character is seen in male?
 

(a) Muscles are comparatively weak	(b) Voice is shrill
(c) Voice is heavy	(d) Beard and mustache is not seen
3. Where testes are situated?
 

(a) Abdominal cavity	(b) Dorsal side of abdominal cavity
(c) (a) and (b) both	(d) Scrotal sac.
4. Which hormone is released from testes ?
 

(a) Testosterone	(b) Estrogen
(c) Progesterone	(d) Relaxin
5. Which hormone is released from ovaries ?
 

(a) Testosterone	(b) Estrogen	(c) Progesterone	(d) (b) and (c) both
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## Questionbank Biology

6. Which of the following gland is seen in male reproductive system ?  
 (a) Seminal vesicle (b) Prostate gland  
 (c) Bulbourethral gland (d) All of these
7. How much lower the temperature of scrotal sac as compare to the normal body temperature ?  
 (a) 3°C (b) 4°C (c) 5°C (d) 6°C
8. What is the size of testis?  
 (a) 6 cm length and 2.5 cm diameter (b) 5 cm length and 2.5 cm diameter  
 (c) 5 cm length and 3.5 cm diameter (d) 6 cm length and 3.5 cm diameter
9. Which connective tissue surrounds testis ?  
 (a) Fibrous tissue (b) Spongy connective tissue  
 (c) Tunica albuginea (d) None of them
10. Seminiferous tubule in testis are lined with Which type of cells ?  
 (a) Germinal cells (b) only germinal cells (c) Sertoli cell (d) Both a and c
11. In testis which cells produce sperms?  
 (a) Germinal cells (b) Epithelial cell (c) Sertoli cell (d) Both a and c
12. Which cells provides nutrition to the sperms ?  
 (a) Germinal cells (b) Epithelial cell (c) Sertoli cell (d) None of them
13. In testis which cells are present in the interstitial space between seminiferous tubules?  
 (a) Sertoli cells (b) Germinal cells (c) Leydig cells (d) (a)and(b)both
14. Which cells secretes testosterone ?  
 (a) Sertoli cells (b) Germinal cells (c) Interstitial cells (d) (a)and(b)both
15. Where seminiferous tubules of each lobe empty sperms ?  
 (a) Vas deference (b) Vasa efferentia (c) Epididymus (d) Seminal vesicles
16. Where is situated epididymis ?  
 (a) External surface of the testis (b) Above the testis  
 (c) Below the testis (d) Internal surface of the testis
17. What is length of epididymis?  
 (a) 6 c.m (b) 6 feet (c) 6 meter (d) 6 inch
18. Function of epididymis is ...  
 (a) A temporary storagesite  
 (b) For the immature sperms complete their maturation process  
 (c) Gain the ability of swimming (motility)  
 (d) All of these
19. When sperms are transported in to vas deference from epididymis ?  
 (a) Male is not sexually stimulated (b) Male is sexually stimulated  
 (c) The walls of the epididymis contract (d) First -b and after -c process occurs
20. What is length of vas deference ?  
 (a) 45 inch (b) 45 mm (c) 45 cm (d) 4.5 meter

21. Through which of the following vas deferens runs upward from epididymis and enters the abdominal cavity ?  
 (a) Ejaculatory duct      (b) Inguinal canal      (c) Urethra      (d) (a) and (b) both
22. The distal end of vas deferens is expanded and in this region it opens ?  
 (a) Prostate gland      (b) Bulbourethral gland      (c) Seminal vesicle      (d) Ejaculatory duct
23. What is the region present between part of seminal vesicle and duct of urinary bladder called ?  
 (a) Ejaculatory duct      (b) Duct of urinary  
 (c) Urethra      (d) Seminal vesicle duct
24. Duct of which gland joins with urethra before it passes through penis ?  
 (a) Prostate gland      (b) Bulbourethral gland  
 (c) Seminal vesicle gland      (d) (a) and (b) both
25. In male accessory reproductive glands which is incorrect ?  
 (a) Seminal vesicle      (b) Prostate gland      (c) Urinary bladder      (d) Bulbourethral gland
26. The seminal vesicles are located at ?  
 (a) Over urinary bladder      (b) Base of the urinary bladder  
 (c) Near urinary bladder      (d) Besides urinary bladder
27. What percentage of semen is produced by seminal vesicles ?  
 (a) 50%      (b) 55%      (c) 60%      (d) 65%
28. Which substances present in seminal vesicles is thick and yellowish secretion ?  
 (a) Sugar      (b) Vitamin-c      (c) Fat      (d) (a) and (b) both
29. What is provided to sperms by secretion of seminal vesicles ?  
 (a) Nourishment      (b) Activating      (c) Lubricant      (d) (a) and (c) both
30. Where is prostate gland located ?  
 (a) Over urinary bladder      (b) Base of the urinary bladder  
 (c) Posterior region of the urinary      (d) Side of the urinary bladder
31. What is provided to sperm by secretion of prostate gland ?  
 (a) Nourishes      (b) Activating  
 (c) Lubricant      (d) (a) and (c) both
32. Where is bulbourethral gland located ?  
 (a) Beneath the prostate      (b) Lateral side of urethra  
 (c) Over urinary bladder      (d) (a) and (b) both
33. Which gland secretes alkaline fluid ?  
 (a) Seminal vesicle gland      (b) Prostate gland  
 (c) Bulbourethral gland      (d) (b) and (c) both
34. What is the function of bulbourethral gland secretion ?  
 (a) Nourishes sperms  
 (b) role in activating sperms  
 (c) Serves as a lubricant during sexual intercourse  
 (d) Enhancing the motility of sperms

35. Mixture of which of the following constitute semen ? OR  
 (a) Sperms (b) Secretion of accessory glands  
 (c) Organic substance (d) Both a and b
36. What is PH of semen ?  
 (a) 7.3 to 7.7 (b) 7.2 to 7.6 (c) 7.4 to 7.8 (d) 7.5 to 7.9
37. What is PH of vaginal fluid ?  
 (a) 3.5 to 4.0 (b) 3.6 to 4.1 (c) 3.7 to 4.2 (d) 3.8 to 4.3
38. The average volume of semen for each ejaculation is .....  
 (a) 3 to 4 ml (b) 3.5 to 4.5 ml (c) 4 to 5 ml (d) 4.5 to 5.5 ml
39. Which cylindrical organ is located at frontal region of scrotal sacs ?  
 (a) Epididymus (b) Vas deference (c) Penis (d) (a) and (b) both
40. Internally the penis is.....  
 (a) Composed of three cylindrical mass of connective tissue bound together  
 (b) Composed of three cylindrical mass of tissue bound together by fibrous tissue  
 (c) Composed of three cylindrical mass of epithelium tissue bound together  
 (d) Composed of three mass of tissue only
41. When does penis get erected ?  
 (a) If masses of tissue filled with air (b) If masses of tissue filled with blood  
 (c) If masses of tissue filled with hormones (d) (b) and (c) occurs both
42. Which is accessory part of female reproductive system ?  
 (a) Vulva (b) Pudendum (c) Mammary gland (d) Vagina
43. What is size of ovaries ?  
 (a) 3 c.m long , 2 c.m wide , 1 c.m thick (b) 2 c.m long , 2 c.m wide , 1 c.m thick  
 (c) 3 c.m long , 2 c.m wide , 2 c.m thick (d) 2 c.m long , 2 c.m wide , 2 c.m thick
44. Where are ovaries situated ?  
 (a) In upper pelvic cavity (b) Below pelvic cavity  
 (c) At one on each side of uterus (d) (a) and (c) both
45. The ovaries maintain their position by ....  
 (a) Series of ligaments (b) Connective layer  
 (c) Epithelium layer (d) Muscular filament
46. What is the entry point for blood vessel and nerves into the ovaries called ?  
 (a) Hilus part (b) Hilus  
 (c) Hilus pors (d) None of them
47. Which tissue layer covers the ovary ?  
 (a) Columnar epithelium (b) Squamous epithelium  
 (c) Cuboidal epithelium (d) Ciliary epithelium
48. What is the surrounding layer of the ovary called ?  
 (a) Germinal epithelium (b) Tunica albuginea  
 (c) Stroma (d) Collagenovs

49. What is called a capsule of collagenous connective tissue immediately after the germinal epithelium of ovaries?  
 (a) Stroma (b) Tunica albuginea (c) Ovarian epithelium (d) None of them
50. Which tissue layer of tunica albuginea  
 (a) Connective tissue (b) Collagenous connective tissue  
 (c) Epithelial tissue (d) Collagenous epithelium tissue
51. What is called a region of connective tissue deep to the tunica albuginea ?  
 (a) Stroma (b) Follicular epithelium (c) Graffian follicles (d) Corpus luteum
52. Ovarian stroma is composed by ..... ?  
 (a) Cortex (b) Medulla (c) Follicles (d) (a) and (b) both
53. Stroma of ovarian cortex contains .....  
 (a) Ovarian follicles (b) Corpus luteum (c) Graffian follicles (d) (a) and (c) both
54. What is the structure consist of ova and their surrounding tissues in various stages of development its called ?  
 (a) Primary follicle (b) Ovarian follicles (c) Graffian follicles (d) Corpus luteum
55. What is the structure consist of mature ovum and its surrounding tissues its called ?  
 (a) Mature ovum (b) Ovarian follicles  
 (c) Graffian follicle (d) Corpus luteum
56. Graffian follicle after ovulation produces glandular body, it is called ...  
 (a) Graffian follicle (b) Corpus luteum  
 (c) Mass of graffion follicle (d) both a and b
57. Which hormones is produced by corpus luteum ?  
 (a) Estrogen (b) Progesterone (c) Testosterone (d) (a) and (b) both
58. What is length of fallopion tube ?  
 (a) 10 c.m (b) 10 m.m  
 (c) 12 c.m (d) 12 m.m
59. The uterine tube from side runs forwards and becomes associated with it ...  
 (a) Vagina (b) Uterus (c) Urethra (d) Ovary
60. Where an ovum is fertilization occurs ?  
 (a) Vagina (b) Uterus (c) Fallopion tube (d) Infundibullum
61. Where is uterus situated ?  
 (a) Between the urinary bladder and rectum (b) Between the urinary bladder and urethra  
 (c) Between the urinary bladder and ovary (d) Between the urinary bladder and intestine
62. What is the shaped of uterus ?  
 (a) Inverted appleshaped (b) Inverted pear shaped  
 (c) Inverted mango shaped (d) None of this
63. The wall of the uterus is made of .....layer .  
 (a) Three (b) Two (c) one (d) Four



64. In which layer of uterus the fertilized egg is implanted ?  
 (a) Endometrium (b) Myometrium  
 (c) Epimetrium (d) None of this
65. It is a bulky middle layer of the uterus and its plays an active role during the delivery of a baby ...  
 (a) Endometrium (b) Myometrium (c) Epimetrium (d) None of this
66. The distal narrow end of the uterus is called.....  
 (a) Vagina (b) Cervix (c) Hymen (d) (a) and (c) both
67. Which part is connected to the uterus through cervix ?  
 (a) Vagina (b) Hymen (c) Mucosal membrane (d) (a) and (c) both
68. It is a fold at the distal end of the vagina ...  
 (a) Hymen (b) Mucosal membrane (c) Cervix (d) Clitoris
69. What is called cushion of fatty tissue in female external genitalia ?  
 (a) Mons pubis (b) Labia majora (c) Labia minora (d) Clitoris
70. Which region of vulva are located below the mons pubis ?  
 (a) Labia majora (b) Labia minora (c) Clitoris (d) None of this
71. What is called a tiny finger like structure which lies at the upper junction of the two labia minora.  
 (a) Penis (b) Clitoris (c) Mons (d) Pubis
72. Which is part of vulva is considered equivalent to the male penis  
 (a) Clitoris (b) Hymen (c) Mons (d) Pubis
73. During puberty stage, which sex hormone stimulate the enlargement of breast ?  
 (a) Progesterone (b) Estrogen (c) Testosterone (d) (a) and (b) both
74. What is called the process of gamete formation in the sexually reproducing animals  
 (a) Spermatogenesis (b) oogenesis (c) Gametogenesis (d) None of this
75. Which cells produces of spermatids.  
 (a) Secondary germinal cells (b) Primary germinal cells  
 (c) Spermatogonium (d) Spermatocytes
76. Name the process involve in multiplication phase of spermatogenesis ?  
 (a) Mitotic (b) Meiosis (c) Amitosis (d) (a) and (b) both
77. In spermatogenesis which cells are produce at the end of multiplication phase ?  
 (a) Primary spermatocyte (b) Spermatogonia  
 (c) Secondary spermatocyte (d) Spermatids
78. In spermatogenesis which cells are produce at the end of the growth phase ?  
 (a) Primary spermatocyte (b) Spermatogonia  
 (c) Secondary spermatocyte (d) Spermatids
79. In spermatogenesis which processes occur for secondary spermatocyte ?  
 (a) Mitotic (b) Meiosis (c) Amitosis (d) (a) and (b) both
80. In spermatogenesis which cells are produced at the end of the maturation phase ?  
 (a) Primary spermatocyte (b) Spermatogonia  
 (c) Secondary spermatocyte (d) Spermatids

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81. The metamorphosis of the spermatids into the sperms is known as.....  
 (a) Multiplication phase (b) The growth phase  
 (c) The maturation phase (d) Spermiogenesis
82. Which enzyme is produced by acrosome ?  
 (a) Testosterone (b) Hyaluronidase  
 (c) FSH (d) LH
83. The acrosome is formed by the.....  
 (a) Mitochondria (b) Golgicomplex (c) Ribosomes (d) Nucleus
84. These form a middle piece of the sperm  
 (a) Mitochondria (b) Golgicomplex (c) Ribosomes (d) Nucleus
85. In oogenesis which cells are produced at the end of multiplication phase ?  
 (a) Primary oocyte (b) Secondary oocyte  
 (c) First polar body (d) Secondary polar body
86. In oogenesis which substances are present in primary oocyte of growth phase  
 (a) Fat and proteins (b) DNA, RNA (c) ATP and enzyme (d) Above all
87. In oogenesis which cell bodies are concentrated in cytoplasm of primary oocyte of the growth phase ?  
 (a) Mitochondrial (b) Golgicomplex (c) Ribosomes (d) Above all
88. In oogenesis which cells are produced at the first division of primary oocyte in maturation phase ?  
 (a) Secondary oocyte (b) First polar body  
 (c) Secondary polar body (d) (a) and (b) both
89. Which stage of cell at the time of ovulation.  
 (a) Secondary oocyte (b) First polar body  
 (c) Secondary polar body (d) Primary oocyte
90. When sperm penetrate secondary oocyte during its unequal meiotic division, how many polar bodies are produced ?  
 (a) One (b) Two (c) Three (d) None of this
91. The events of the menstrual cycle are the cyclic changes in the....  
 (a) Endometrium (b) Myometrium (c) Epimetrium (d) All of this
92. The events of menstrual cycle are comprised of .... days.  
 (a) 27 days (b) 28 days (c) 29 days (d) 30 days
93. In menstrual cycle which period is known as menstrual phase ?  
 (a) 1 to 5 days (b) 6 to 14 days  
 (c) 15 to 28 days (d) 14 to 15 days
94. Which period of the cycle is known as a proliferative phase ?  
 (a) 1 to 5 days (b) 6 to 14 days  
 (c) 15 to 28 days (d) 14 to 15 days
95. In menstrual cycle on which day ovulation occurs ?  
 (a) on 12th day (b) on 13th day (c) on 14th day (d) on 15th day

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96. In menstrual cycle during which days rising estrogen levels ?  
 (a) 1 to 5 days (b) 6 to 14 days (c) 14 to 15 days (d) 15 to 28 days
97. In menstrual cycle on which days rises progesterone levels ?  
 (a) 1 to 5 days (b) 6 to 14 days (c) 14 to 15 days (d) 15 to 28 days
98. The sperms emptied in the vagina start moving towards oviducts through the uterus which is helpful in their locomotion  
 (a) Contraction of uterine wall (b) Contraction vagina passage  
 (c) The slimy secretion of oviduct wall (d) All these
99. What time is taken by the sperm emptied in vagina, to move toward uterus ?  
 (a) 4 to 5 hrs (b) 5 to 6 hrs (c) 3 to 4 hrs (d) 2 to 3 hrs.
100. In fertilization which part of sperm enters the secondary oocyte ?  
 (a) Tail (b) Head (c) Middle part (d) (b) and (c) both
101. After fertilization which changes prevents entry of other sperms in to the oocytes.  
 (a) Egg membrane (b) Fertilization membrane  
 (c) Vitelline membrane (d) (a) and (c) both
102. When fertilized ovum is convert into zygote ?  
 (a) On entry of sperm in ovum  
 (b) On entry of sperm in secondary pronucleus  
 (c) On fusion of male and female pronucleus  
 (d) After change into fertilization membrane
103. During movement of zygote into oviduct the division of zygote in 2 to 16 daughter cells.  
 This process called  
 (a) Cleavage (b) Gastrulation (c) Morula (d) (a) and (b) both
104. The division of it forms in to 16 daughter cells..called....  
 (a) Blastocell (b) Blastomeres (c) Morula (d) (a) and (b) both
105. The embryo with 16 cells is called.....  
 (a) Blastocyst (b) Blastomeres (c) Morula (d) Cleavage
106. What time period is required to form blastocyst ?  
 (a) One week (b) 8 days (c) two week (d) 9 days
107. The fluid within the blastocyst is formed by the cells of \_\_\_\_\_ ?  
 (a) Blastomere (b) Trophoblast (c) Inner layer of blastocyte (d) None of this
108. Which cells secrete the enzymes for make implantation of embryo possible ?  
 (a) Trophoblast (b) Blastomere  
 (c) Outer layer of uterus (d) Outer layer of blastocyst
109. In human normally what is the period of pregnancy ?  
 (a) 266 days (b) 280 days (c) 270 days (d) 275 days
110. The fertilized ovum during the first 12 weeks is called \_\_\_\_\_.  
 (a) Embryo (b) Foetus  
 (c) Blastocyte (d) (a) & (b) both

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111. In humans after implantation what is the elaborate projection developed from trophoblast called ?  
(a) Embryonic Layer (b) Chorionic vili  
(c) Placenta (d) Umbilical cord
112. In humans embryonic development chorionicvilli which co-operate with the tissue of the mothers uterus to forms ...  
(a) Placenta (b) Umbilical cord  
(c) Amniotic cavity (d) Embryonic disc
113. Function of the placenta is ...  
(a) to deliver nutrients to embryo  
(b) to deliver oxygen to embryo  
(c) remove wastes from the embryonic blood  
(d) all of these
114. Which part present between placenta and embryo ?  
(a) Umbilical cord (b) Amniotic cavity  
(c) Embryonic disc (d) (b) & (c) both
115. Which hormones are not produced by placenta ?  
(a) hcG (b) hpL  
(c) estrogens (d) relaxin
116. The signals for parturition originate from \_\_\_\_\_ .  
(a) Fully developed foetus (b) placenta  
(c) Uterus (d) (a) & (b) both
117. At the time of delivery which hormones stimulate more frequent and powerful construction of the uterus ?  
(a) Oxytocin and Prostaglandins  
(b) Estrogen and Progesterone  
(b) Oxytocin and Vasopressin  
(d) Estrogen and Prostaglandins
118. During delivery which glands send signals for the release of oxytocin ?  
(a) Posterior Pituitary (b) Anterior Pituitary  
(c) Hypothalamus (d) None of this
119. After delivery mammary gland start producing milk, In milk which necessary substance is present for immunity ?  
(a) Lactose (b) Protein  
(c) Fat (d) Antibodies
120. How much blood is lost during menstrual cycle period ?  
(a) 25 to 100 ML (b) 50 to 150 ML  
(c) 75 to 175 ML (d) 20 to 75 ML

121. Match Column-I and Column-II correctly and choose the right answer.

**Column-I**

- (P) Male
- (Q) Female
- (R) Testes
- (S) Ovary
- (a) P-iii, Q-iv, R-ii, S-i
- (b) P-ii, Q-i, R-iv, S-iii
- (c) P-iii, Q-iv, R-i, S-ii
- (d) P-iv, Q-iii, R-i, S-ii

**Column-II**

- (i) Scrotal sac
- (ii) Upper pelvic cavity
- (iii) Mammary gland is namesake only
- (iv) Voice is shrill

122. Match Column-I and Column-II correctly and choose the right answer.

Column-I

- (P) Tunica Albuginea
- (Q) Semini feroustobule
- (R) Sertoli cell
- (S) Leydig's cell
- (a) P-ii, Q-iv, R-iii, S-i
- (b) P-ii, Q-iv, R-i, S-iii
- (c) P-iii, Q-i, R-ii, S-iv
- (d) P-iv, Q-iii, R-ii, S-i

Column-II

- (i) Nutrition
- (ii) Collagenous connective tissue
- (iii) Secretes testosterone
- (iv) Produces sperms

123. **Which of the following option shows correctly matched pairs for colum I and colum II**

Column-I

- (P) Seminal vesicle
- (Q) Prostate gland
- (R) Bulbourethral gland
- (S) Semen
- (a) P-iii, Q-iv, R-i, S-ii
- (b) P-iii, Q-iv, R-ii, S-i
- (c) P-i, Q-ii, R-iii, S-iv
- (d) P-iv, Q-iii, R-i, S-ii

Column-II

- (i) Serves as Lubricant
- (ii) Delicate sperms and enhancing their motility
- (iii) Nourishes the sperm
- (iv) Activating sperms

124. **Which of the following option shows correctly matched pairs for colum I and colum II**

Column-I

- (P) Germinal epithelium
- (Q) Ovarian follicles
- (R) Graffian follicle
- (S) Corpus luteum
- (a) P-iv, Q-i, R-iii, S-ii
- (c) P-iv, Q-iii, R-ii, S-i

Column-II

- (i) Ova and their surrounding tissues
- (ii) Mature ovum and its surrounding tissues
- (iii) After ovulation produce glandular body
- (iv) Cuboidal epithelium
- (b) P-iv, Q-iii, R-ii, S-i
- (d) P-iv, Q-i, R-ii, S-iii

125. Which of the following option shows correctly matched pairs for column I and column II

**Column-I**

**Column-II**

- |  |   |
|--|---|
| (P) Endometrium<br>(Q) Myometrium<br>(R) Epimetrium<br>(S) Hymen<br>(a) P-ii, Q-iv, R-i, S-iii<br>(b) P-iii, Q-i, R-ii, S-iv<br>(c) P-i, Q-iii, R-iv, S-ii<br>(d) P-iv, Q-iii, R-i, S-ii | (i) Uterus outer layer<br>(ii) Uterus innermost layer<br>(iii) Fold at distal end of the vagina<br>(iv) Uterus middle layer |
|--|---|

126. Which of the following option shows correctly matched pairs for column I and column II

**Column-I**

**Column-II**

- |  |   |
|--|---|
| (P) Mons Pubis<br>(Q) Labia majora<br>(R) Labia Minora<br>(S) Clitoris<br>(a) P-iv, Q-iii, R-ii, S-i<br>(b) P-iii, Q-iv, R-ii, S-i<br>(c) P-ii, Q-iii, R-i, S-iv<br>(d) P-ii, Q-iv, R-iii, S-i | (i) Tiny Finger like structure<br>(ii) Folds of tissue<br>(iii) Cushion of fatty tissue<br>(iv) Surrounding the vulva |
|--|---|

127. Choose the correct option for the proesses of spermatoyenesis from column I, column II

**Column-I**

**Column-II**

- |  |   |
|--|---|
| (P) Multiplication Phase<br>(Q) The growth Phase<br>(R) The maturation Phase<br>(S) Spermiogenesis<br>(a) P-iv, Q-iii, R-ii, S-i<br>(b) P-iii, Q-iv, R-ii, S-i<br>(c) P-ii, Q-iii, R-iv, S-i<br>(d) P-ii, Q-i, R-iv, S-iii | (i) Sperm<br>(ii) Spermatogonium<br>(iii) Primary Spermatocyte<br>(iv) Spermatids |
|--|---|

128. Choose the correct option for the proesses of spermatoyenesis from column I, column II

**Column-I**

**Column-II**

- |  |  |
|--|--|
| (P) Days 1-5<br>(Q) Days 6-13<br>(R) Day 14<br>(S) Day 15-28<br>(a) P-i, Q-iv, R-iii, S-ii<br>(c) P-iii, Q-ii, R-iv, S-i | (i) Proliferative Phase<br>(ii) Ovulation<br>(iii) Corpusluteum Developpe<br>(iv) Endometrium Disintegrantes<br>(b) P-ii, Q-iii, R-iv, S-i<br>(d) P-iv, Q-i, R-ii, S-iii |
|--|--|

129. Which of the following option shows correctly matched pairs for column I and column II

Column-I	Column-II
(P) Foetus Cells	(i) Relaxin
(Q) Placenta	(ii) Hyaluronidase
(R) Acrosome	(iii) Prostaglandins
(S) Ovary	(iv) Oxytocin
(a) P-iv, Q-iii, R-ii, S-i	(b) P-iii, Q-iv, R-ii, S-i
(c) P-ii, Q-iii, R-iv, S-i	(d) P-ii, Q-iii, R-iv, S-i

130. Which of the following option shows correctly matched pairs for column I and column II

Column-I	Column-II
(P) The egg membrane becomes slightly separated from proto plasam	(i) Blastocyst
(Q) The division of zygote	(ii) Fertilization membrane
(R) 16 daughter cells	(iii) Cleavage
(S) Morula stage continues to divide and transforms into	(iv) Blastomeres
(a) P-iii, Q-ii, R-iv, S-i	(b) P-ii, Q-iii, R-iv, S-i
(c) P-ii, Q-i, R-iv, S-iii	(d) P-iii, Q-iv, R-i, S-ii

**Note :-** Q No. 131 to 145 Read the assertion and the reason carefully to mark the correct option out of the options given.

- (a) Assertion are true and the reason is a correct explanation of the assertion.
- (b) Assertion are true and the reason is not a correct explanation of the assertion.
- (c) The assertion is true but the reason is false.
- (d) The assertion is false but the reason is true.

131. Assertion :- Testes in male shows internal dimorphism.

Reason :- The testes are situated in the scrotal sac.

- (a)                      (b)                      (c)                      (d)

132. Assertion :- Scrotalsac is located out side of the body.

Reason :- It's helps to maintain the temperature of the testes.

- (a)                      (b)                      (c)                      (d)

133. Assertion :- Each lobule contains one to four tightly coiled seminiferous tubules in each testis.

Reason :- Seminiferous tubule is lined by one type of cells.

- (a)                      (b)                      (c)                      (d)

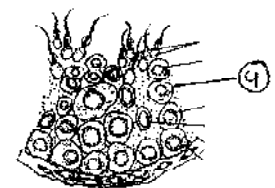
134. Assertion :- Sertoli cells produces sperms.  
Reason :- Leydigs cells secretes the male sex hormone testosterone.  
(a) (b) (c) (d)
135. Assertion :- The epididymis is a highly coiled tube about 6 meteres long  
Reason :- It provides a temporary storage site for the immature sperms.  
(a) (b) (c) (d)
136. Assertion :- The vasdeferens is about 45 M long tube.  
Reason :- It runs upward from the epididymis through the inguinal canal  
(a) (b) (c) (d)
137. Assertion :- The duct of urinary bladder joins the ejaculatory duct.  
Reason :- Now it is known as urinary canal  
(a) (b) (c) (d)
138. Assertion :- Seminal vesicle produce 50% fluid volume of semen.  
Reason :- Semen is thick and yellowish secretion.  
(a) (b) (c) (d)
139. Assertion :- In ovary graffian follicle after ovulation produces glandular body.  
Reason :- It produces the hormone progesterone.  
(a) (b) (c) (d)
140. Assertion :- Myometrium is middle layer of the uterus.  
Reason :- It is composed of bundles of smooth muscle.  
(a) (b) (c) (d)
141. Assertion :- Clitoris is female external genitalia  
Reason :- Which lies at the upper junction of the two labia majora.  
(a) (b) (c) (d)
142. Assertion :- In spermatogenesis primary spermatocyte is produce at end of the multiplication phase.  
Reason :- Primary spermatocyte is diploid.  
(a) (b) (c) (d)
143. Assertion :- In menstrual cycle endometrium disintegrates during day 1-5.  
Reason :- Due to lower concentration of female sex hormones in blood.  
(a) (b) (c) (d)
144. Assertion :- In ovary end of the oogenesis process secondary oocyte and one first polar body divides in it.  
Reason :- Ovulation take place at the secondary oocyte stage.  
(a) (b) (c) (d)
145. Assertion :- Zygote transforms into blastocyst by cleavage.  
Reason :- All these changes take place in a period of one week  
(a) (b) (c) (d)



146. Which is incorrect for sexual dimorphism of male ?
- Mammary gland is namesake only
  - Voice is shrill
  - Muscle are strong
  - Beard and mustache develops
147. Which pair is not correct ?
- teste - scrotalsac
  - ovary - upper pelvic cavity
  - vas deferens - ejaculatory duct
  - Fallopion tube - Ovulation
148. Which option shows correct chronology of cell production during spermatogenesis ?
- Germinal epithelium --> Spermatogonium --> Primary Spermatocyte --> Secondary Spermatocyte -->Spermatids.
  - Germinal epithelium --> Spermatids --> Spermatogonium --> Primary Spermatocyte --> Secondary Spermatocyte
  - Germinal epithelium --> Primary Spermatocyte --> Secondary Spermatocyte --> Spermatogonium --> Spermatids.
  - Germinal epithelium --> Primary Spermatocyte --> Spermatogonium --> Secondary Spermatocyte--> Spermatids.
149. Which option is incorrect for the centriole function in spermiogenesis ?
- The two centrioles of the spermatids
  - The antrior one is known as proximal centriole
  - One is known as distal centriole
  - The distal centriole changes into the tail.
150. The correct order of the changes in hormones level at first day to 28th day of menstrual cycle.
- estrogen and progesterone level is lower --> Estrogen rising --> Progesterone rising.
  - estrogen and progesterone level is higher --> Estrogen lower --> Progesterone rising.
  - estrogen and progesterone level is lower --> Estrogen rising --> Progesterone lower.
  - estrogen and progesterone level is higher --> Estrogen rising --> Progesterone rising.

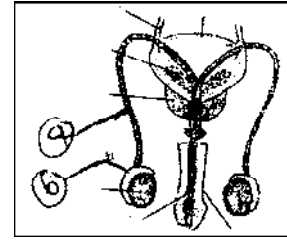
\* **Identfy the parts from given diagraeme (151 to 155)**

151. Identify the part-a
- Spermatid
  - Secondary spermatocyte
  - Primary Spermatocyte
  - Sertoli cell



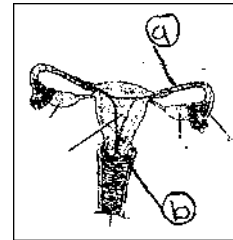
152. Identify the part (a) and (b) in the given diagram respectively

- (a) Vas Deferens --> epididymis
- (b) Vas Deferens --> testes
- (c) Epididymis --> testes
- (d) Vas Deferens --> Epididymis



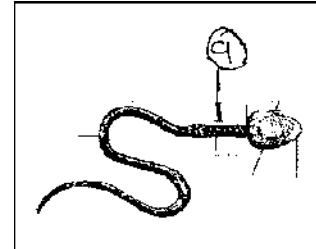
153. Identify the part (a) and (b) in the given diagram respectively

- (a) Oviducal funnel - Ovary
- (b) Oviducal funnel - Cervix
- (c) Ovary - cervix
- (d) Uterus - Oviducal funnel

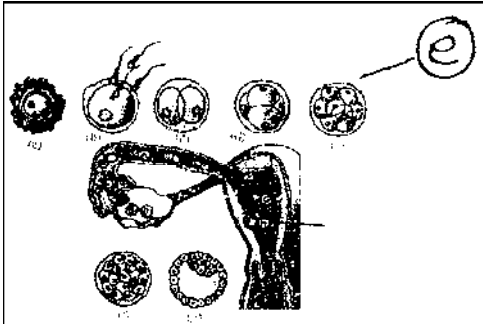


154. Identify the part (a) and (b) which organelle is present maximum.

- (a) Middle piece --> Golgicomplex
- (b) Middle piece --> Centrioles
- (c) Tail piece --> Nucleus
- (d) Middle piece --> Mitochondria



155. Identify stage of part (e) in the given diagram respectively



- (a) Cleavage
- (b) Morula
- (c) 16 cells stage
- (d) Blastocyst

156. In human the unpaired male reproductive structure is ... ..

(Kerala PMT 2010)

- (a) Seminal vesicle
- (b) Prostate
- (c) Bulbourethral gland
- (d) Testes

157. Which of the following is an accessory reproductive gland in male mammals. (CPMT 1988, MPMT 1988)

- (a) Prostate gland
- (b) Gastric gland
- (c) Mushroom shaped gland
- (d) Inguinal gland

158. The seminiferous tubules of the testis are lined by the germinal epithelium consisting...

(CPMT 1999, Orissa-Jee 2011)

- (a) Cells of Sertoli
- (b) Spermatozoa
- (c) Spermatogonium
- (d) Spermatids

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159. Sperms cells are produced in (Orrissa-Jee 2008)  
(a) Semini ferous tubules (b) Interstitial space  
(c) Epididymis (d) Prostate gland
160. In the absence of acrosome the sperm \_\_\_\_\_. (Kcet 2010)  
(a) Cannot penetrate the egg (b) Cannot get energy  
(c) Cannot get food (d) Cannot swim
161. If after ovulation no pregnancy result the corpus luteum (MP PMT 1990)  
(a) Is maintained by the presence of progesterone  
(b) Degenerates in a short time  
(c) Becomes active and secretes lot of FSH and LH  
(d) Produces lot of oxytocin and relaxin
162. How many secondary spermatocyte will be required to form 400 spermatozoans. (MP PMT 2006)  
(a) 100 (b) 200 (c) 40 (d) 400
163. 1st polar body is formed at which stage of oogenesis (AFMC 2009)  
(a) 1st Meiosis (b) 2nd Mitosis  
(b) 1st Mitosis (d) Differentiation
164. In oogenesis diploid cell produce \_\_\_\_\_ ovum. (Orrissa-Jee 2008)  
(a) 1 (b) 2 (c) 3 (d) 4
165. The process of delivery of the foetus is called (Kerala-PMT 2010)  
(a) Parturition (b) Implantation  
(c) Fertilisation (d) Lactation

**ANSWER KEY**

1 b	2 c	3 d	4 a	5 d	6 d
7 a	8 b	9 c	10 d	11 a	12 c
13 c	14 c	15 b	16 a	17 c	18 d
19 d	20 c	21 b	22 c	23 a	24 b
25 c	26 b	27 c	28 d	29 a	30 c
31 b	32 d	33 d	34 c	35 d	36 b
37 a	38 a	39 c	40 b	41 b	42 c
43 a	44 d	45 a	46 b	47 c	48 a
49 b	50 b	51 a	52 d	53 a	54 b
55 c	56 b	57 b	58 a	59 b	60 c
61 a	62 b	63 a	64 a	65 b	66 b
67 a	68 b	69 a	70 a	71 b	72 a
73 b	74 c	75 b	76 a	77 b	78 a
79 b	80 d	81 d	82 b	83 b	84 a
85 a	86 d	87 d	88 d	89 a	90 c
91 a	92 b	93 a	94 b	95 c	96 b
97 d	98 d	99 b	100 d	101 b	102 c
103 a	104 b	105 c	106 a	107 b	108 a
109 a	110 a	111 b	112 a	113 d	114 a
115 d	116 d	117 a	118 a	119 d	120 d
121 c	122 b	123 a	124 d	125 a	126 b
127 c	128 d	129 a	130 b	131 a	132 b
133 c	134 d	135 a	136 b	137 c	138 d
139 a	140 b	141 c	142 d	143 a	144 a
145 d	146 b	147 d	148 a	149 d	150 a
151 b	152 a	153 b	154 d	155 b	156 b
157 a	158 a	159 a	160 a	161 b	162 b
163 a	164 a	165 a			



## Unit :- VI

## Chapter-4. Reproductive Health

## IMPORTANT POINTS

The normal functions of reproductive system are referred as reproductive Health. India was the first country in the world to kick off action plans and programmes at a national level to get total reproductive health as a social goal. These programmes called family planning were initiated in 1952 and were periodically assessed over the past decades.

Proper information about reproductive organs, adolescence and related changes, safe and hygienic sexual practices, sexually transmitted diseases STD, AIDS, etc would help people especially those in the adolescent age group educating people especially couples and those in marriageable age group about available birth control options, care of pregnant mothers, postnatal care of the mother and child, importance of breast feeding, equal opportunities for the male and the female child etc can make society healthy.

India is the second most populous country in the world after China. The family planning methods provided by the family planning programme are vasectomy, tubectomy, IUD, conventional contraceptive and oral pills.

Voluntary termination of pregnancy before foetus becomes viable is called induced abortion or MTP.

Diseases or infections which are transmitted through sexual intercourse are collectively called STD. A number of couples all over the world including India are facing infertility. Common methods of ART are IUI, ZIFT, GIFT.

**For the given options select the correct options (a, b, c, d) each carries one mark.**

- According to WHO, reproductive health means a total well-being in all aspects of reproduction like..
  - Physical, Emotional, Behavioral, Social
  - Physical, Mental, Health, Sexual Habits, Healthy body
  - Physical, Mental, Behavioural, Development of sexual organs
  - Physical, Mental, Emotional, Social
- What is the rank of India to kick off action plans and programs at national level to get total reproductive health as a social goal?
 

(a) First	(b) Second	(c) Third	(d) Fourth
-----------	------------	-----------	------------
- What are the programmes called to get total reproductive health as a social goal of national level?
 

(a) Family care	(b) Family planning	(c) Family organisation	(d) Reproductive care
-----------------	---------------------	-------------------------	-----------------------
- When was family planning initiated?
 

(a) 1950	(b) 1951	(c) 1952	(d) 1953
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14. Which country ranks first in population ?  
 (a) America                      (b) Russia                      (c) China                      (d) Australia
15. What is the percentage population of india compared to the world's population ?  
 (a) 16.80%                      (b) 16.85%                      (c) 16.90%                      (d) 16.87%
16. What percentage of region does indian population occupy ?  
 (a) 2.4%                      (b) 3.4%                      (c) 4.4%                      (d) 5.4%
17. What was the population of india during independence (in millions)  
 (a) 335                      (b) 338                      (c) .352                      (d) 342
18. What was the increase in population size of our country from 1951 to 1991 ?  
 (a) 362 to 845                      (b) 361 to 846                      (c) 363 to 847                      (d) 384 to 848
19. What was the size of India's population in 2001 (in millions) ?  
 (a) 1025                      (b) 1028                      (c) 1027                      (d) 1026
20. What was the increase in the size of population from 1951 to 2001 in India ?  
 (a) 2 times                      (b) 3 times                      (c) 3 1/2 times                      (d) 4
21. What is the main factor affecting the population growth ?  
 (a) Increase in health care facilities  
 (b) Better life style  
 (c) Increase in birth rate and decrease in death rate  
 (d) Industrialization.
22. What is our main goal to control population growth ?  
 (a) Decrease in death rate.  
 (b) Decreasing the birthrate  
 (c) Organizing several programmes  
 (d) Promote family planning programmes
23. What is the reason for popularity of barrier method of family planning ?  
 (a) The absence of side effect  
 (b) Comparatively more reliable  
 (c) Protection from sexually transmitted diseases.  
 (d) Both a and b
24. Which is the physical barrier method for family planning in females ?  
 (a) Condom for male  
 (b) Condom for female  
 (c) Diaphragm.  
 (d) Both b and c
25. Which of the following is not a natural family planning method ?  
 (a) Periodic abstinence  
 (b) Interruption coitus  
 (c) Chemical method  
 (d) Lactational amenorrhea

26. Which of the following is not a variation of diaphragm ?  
 (a) Conical cap            (b) Umbrella cap            (c) Vinule cap            (d) a and b both
27. Avvenge the following intne uterine devices(IUDS) in chronological order, non medical IUDS, copper IUDS and hormonal IUDS.  
 (a) First, Secod, Third            (b) Second, First, Third  
 (c) Third, First, Second            (d) First, Second, Third
28. From which day of menstrual cycle the hormonal contracaptive pills should be started ?  
 (a) 5<sup>th</sup> day            (b) 7<sup>th</sup> day            (c) 1<sup>st</sup> day            (d) 2<sup>nd</sup> day
29. Which is not related with reference to hormonal contraceptive pills ?  
 (a) Prevent ovum to release from the ovary  
 (b) Thicken the cervical mucous.  
 (c) Inhibites sperm penetration.  
 (d) Partial activation of cervical mucous
30. Which are the permenent methods of family planning ?  
 (a) Vasectomy, Tubectomy  
 (b) Condom for female, condom for male  
 (c) Copper T and pills.  
 (d) Vasectomy, copper T
31. In Vasectomy which part is tied and cut ?  
 (a) Epididydermis  
 (b) Vas deferens  
 (c) Ejeculatory duct  
 (d) Urinogenital duct
32. Which part is removed in tubectomy ?  
 (a) Funnel of fellopian tube            (b) Ovaries  
 (c) Fallopian tube            (d) Uterus
33. What do you mean induced abortion ?  
 (a) Voluntary termination of pregnancy after foetus become viable  
 (b) Voluntary termination of pregnancy before foetus become viable.  
 (c) Foetus removed at imcomplete gestation months.  
 (d) Accidently foetus is lost .
34. What is the rate of induced abortion per year across the world in numbers ?  
 (a) 45 to 48 millions            (b) 55 to 60 millions  
 (c) 45 to 50 millions            (d) 55 to 58 millions
35. Which are the problems related to the legal induced abortions ?  
 (a) Emotional and moral  
 (b) Redigiatiion and social  
 (c) Mental and physical  
 (d) Both a and b.



36. When did Induced abortion act was passed by Indian Government ?  
 (a) 1970                      (b) 1971                      (c) 1972                      (d) 1980
37. When did 'Induced abortion act' came in to force by Government of India ?  
 (a) 1<sup>st</sup> April 1971                      (b) 1<sup>st</sup> April 1972  
 (c) 1<sup>st</sup> April 1973                      (d) 1<sup>st</sup> April 1974
38. In which of the following Induced Abortion is not necessary ?  
 (a) There is substantial risk the child being born with serious handicaps.  
 (b) Where the pregnancy is the result of rape  
 (c) When the foetus is not of desired sex.  
 (d) Unwanted pregnancy.
39. What are sexually trasmitted diseases ?  
 (a) Diseases transmitted through sexual intercourse are collectively known as...  
 (b) Diseases spread through bacteria.  
 (c) Diseases spread through virus.  
 (d) Diseases spread through protozoans.
40. Which microbes causes sexually transmitted diseases ?  
 (a) Bacteria and virus.  
 (b) Protozoans and Fungi.  
 (c) Nematods & viroids.  
 (d) Both a and b.
41. How many pathogenss cause sexually trasmitted diseases through contacts ?  
 (a) More than 20                      (b) Less than 20                      (c) More than 25                      (d) Less than 25
42. Match following coloumns according to thair age group and amount of sexually transmitted diseases.
- | Column-I                   | Column-II                  |
|----------------------------|----------------------------|
| (P) 15-19                  | (i) medium / moderate      |
| (Q) 20-24                  | (ii) less                  |
| (R) 25-29                  | (iii) very less            |
| (S) 30-34                  | (iv) more                  |
| (a) P-iii, Q-iv, R-i, S-ii | (b) P-ii, Q-iv, R-i, S-iii |
| (c) P-ii, Q-iv, R-i,S-iii  | (d) P-ii, Q-iii, R-iv, S-i |
43. Which microbes cause gonorrhoead ?  
 (a) *Neisseria gonorrhoeae*                      (b) *Treponema pollidium*  
 (c) *Herpis simplex*                      (d) *Tricomonas vaginatis*
44. Which microbes cause syphilis ?  
 (a) *Neisseria gonorrhoeae*                      (b) *Treponema pollidium*  
 (c) *Herpis simplex*                      (d) *Tricomonas vaginalis*

45. Which are the main method for the diagnosis of STDS ?
- (a) By detection of antibodies in blood.
  - (b) Identification of pathogen by culturing them
  - (c) Through a short polynucleotide chain of pathogenic organism
  - (d) With the help of Primer
46. Which diseases is diagnosed through ELISA Test ?
- (a) Gonorrhoea
  - (b) Syphilis
  - (c) AIDS
  - (d) Herpes
47. Which diseases is diagnosed by the identification of antibodies against antigen ?
- (a) Gonorrhoea
  - (b) Syphilis
  - (c) Hepatitis
  - (d) AIDS
48. Give full form of ELISA ?
- (a) Enzyme Linked Immuno Absorbant Assay
  - (b) Enzyme Linking Immuno Assay
  - (c) Enzyme Live Implantations Assay
  - (d) Enzyme Live Immuno Absorbant
49. What is the full form of PCR ?
- (a) Primary Chain Reaction
  - (b) Polymerase Chain Reaction
  - (c) Polymerase Cytosine Reaction
  - (d) Primary Cytosine Reaction
50. Which are the principles to prevent STD diseases ?
- (a) Avoid sex with umknown persons
  - (b) Always use condom during coitus
  - (c) In case of doubt consult a doctor and get treatment if the disease is diagnosed
  - (d) All above
51. Out of following which is the symptom of *Trichomoniasis* ?
- (a) Fever and itching
  - (b) Itching in and around vagina.
  - (c) Liquid around vagina
  - (d) weight loss.
52. Which procedure is used in prenatal diagnosis of chromosomal abnormalities ?
- (a) AFT
  - (b) ART
  - (c) IVF
  - (d) ZIFT.
53. Which method is used to detect the gender of the foetus ?
- (a) ART
  - (b) IVF
  - (c) AFT
  - (d) GIFT
54. Which method is mismatchen ART ?
- (a) IVF
  - (b) AFT
  - (c) ZIFT
  - (d) GIFT
55. What is the meaning of infertility ?
- (a) Unable the produce sperms.
  - (b) Unable to produce ova.
  - (c) Unable the produce children
  - (d) Unable for coitus.

56. Full name of GIFT is....  
 (a) Gamete Intrafallopian transfer  
 (b) Gamete Inferfile Transfer.  
 (c) Gamete In vitro fertilization tube.  
 (d) Gamete Intra fallopion tube.
57. Where does IVF method is useful ?  
 (a) Woman's fallopian tubes are blocked.  
 (b) Man produces very few sperms.  
 (c) Woman produces very few ova.  
 (d) Both a and b.
58. In which Assisted Reproductive Technology the very young embryo is transferred to the woman ?  
 (a) IVF                      (b) ZIFT                      (c) GIFT                      (d) ART
59. In which Assisted Reproductive technology the very young embryo is transferred to the fallopian tube insted of the uterus ?  
 (a) IVF                      (b) ZIFT                      (c) GIFT                      (d) ART.
60. In which Assisted reproductive technology and sperms are transfered in the fallopian of woman ?  
 (a) IVF                      (b) ZIFT                      (c) GIFT                      (d) ART.
61. In which Assisted Reproductive technology fertilization occurs in woman's body ?  
 (a) (a) IVF                      (b) ZIFT                      (c) GIFT                      (d) ART.
62. Why in ART procedures sometimes involve the use of donor eggs or doner sperms ?  
 (a) A woman can not produce ovum.  
 (b) When the woman or man has a genetic disease.  
 (c) Problem in coitus  
 (d) Both a and b
63. When does a previously frozen embryos needed ?  
 (a) Fertilization can not occur in woman  
 (b) To care infertility  
 (c) Problem in coitus  
 (d) Both a and b
64. Match colum I and II and find proper option ?
- | (a) Colum-I | Colum-II                                |
|-------------|---|
| P-1952      | (i) Passed MTP Act.                     |
| Q-1947      | (ii) Population of India 361 millions.  |
| R-1951      | (iii) Population of India 342 millions. |
| S-1971      | (iv) Begining of family planning.       |
- (a) (P - iv) (Q - iii) (R - ii) (S - i)  
 (b) (P - iii) (Q - iv) (R - ii) (S - i)  
 (c) (P - ii) (Q - i) (R - iv) (S - iii)  
 (d) (P - ii) (Q - iii) (R - i) (S - iv)

65. Find out correct option of column I (aids) of family planning and method of family planning .

**Column-I**

P-Copper T

Q-Vasectomy

R-Pills

S-Condom

(a) (P - iii) (Q - ii) (R - iv)(S - i)

(c) (P - iii) (Q - ii) (R - iv)(S - i)

**Column-II**

(i) Permanent method

(ii) Temporary method

(iii) Intrauterine method

(iv) Hormone method.

(b) (P - iii) (Q - i) (R - iv)(S - ii)

(d) (P - ii) (Q - iii)(R - iv)(S - i)

66. Find out true options from column I and II.

**column-I**

P-Male condom

Q-Femlae condom

R-Diaphram

S-Copper T

(a) (P - ii) (Q - iv) (R - i) (S - iii)

(b) (P - ii) (Q - iii) (R - iv) (S - i)

(c) (P - ii) (Q - i) (R - iv) (S - iii)

(d) (P - ii) (Q - iii) (R - iv) (S - i)

**column-II**

(i) uterus

(ii) penis

(iii) vagina

(iv) cervix.

67. Match following column I and II for STDs and its carrier and select correct option

**column-I**

P-Gonorrhoeo

Q-Syphilis

R-Genital herpes

S-Trichomoniasis

(a) (P - ii) (Q - i) (R - iii) (S - iv)

(b) (P - iii) (Q - iv) (R - ii) (S - i)

(c) (P - ii) (Q - iii) (R - i) (S - iv)

(d) (P - ii) (Q - iv) (R - i) (S - iii)

**column-II**

(i) *Herpic simplex*

(ii) *Neisseria gonovohoeae*

(iii) *Trichomonas vaginalis*

(iv) *Treponema pallidium*

68. Match column I and II about Assisted Reproductive Technology and its methods and select correct option.

**column -I**

P-IVF

Q-ZIFT

R-GIFT

S-AFT

(a) (P - ii) (Q - i) (R - iv) (S - iii)

(c) (P - iii) (Q - iv) (R - ii) (S - i)

**column-II**

(i) In vitro fertilization,embryo implantion fallopian tube

(ii) In vitro fertization,embryo implantion uterus.

(iii) Prenatal diagnosis of foetus for genetic disorder.

(iv) In vivo fertilization,sperm and ova transferred in fallopian tube.

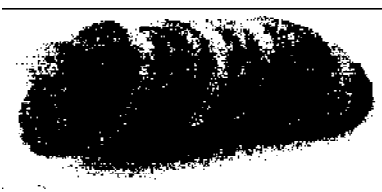


(b) (P - iv) (Q - iii) (R - ii) (S - i)

(d) (P - iv) (Q - iii) (R - i) (S - ii)

69. Which is not true for population explosion ?  
 (a) Increased rate of industrialization and urbanization.  
 (b) Encroachment on land ,air and water.  
 (c) scarcity of food , habitat and clothes.  
 (d) country develops more.
70. Given statement A and reason-R find out correct statement out of given option .  
 A (statement) Reproductive health is define by WHO.  
 R (reason) It is a world health organization.  
 (a) A is correct but R is an explanation of X.  
 (b) A is correct but R done give correct explanation of X  
 (c) A is correct and reason R is wrong.  
 (d) A is not correct and reason R is correct.
71. Statement A - Reproductive and child health care programme is popular.  
 Reason R - It gives explanation about only STD diseases.  
 (a) (b) (c) (d)
72. Statement X - By Introducing sex education in schools,true information can be provided to adolescence.  
 Reason R - sex education misguides students.  
 (a) (b) (c) (d)
73. Statement A - Non government organizations do not implement programme of reproductive health care.  
 Reason R - Implemenation needs professional experties and materials.  
 (a) (b) (c) (d)
74. Statement A- Population has decreased is European countries.  
 Reason R - India is the second most populous country.  
 (a) (b) (c) (d)
75. Statement A - In developing countries due to limited resources therer is a decrease in available resources.  
 Reason R - Population explosion leads to these problems  
 (a) (b) (c) (d)
76. Statement A - Birth rate and deathrate are not main factors affecting population growth  
 Reason R - Increase in health and hygine facilities and improvment in lifestyle.  
 (a) (b) (c) (d)
77. Statement A - Goverment of India organizes various programmes to control the population explosion.  
 Reason R - At present the programmes to prevent more reproductive related area is known as family planning .  
 (a) (b) (c) (d)

78. Statement A - A variety of barrier method suitable for both man and woman are available in family planning.  
Reason R - The aim of these methods is to prevent live sperms from meeting the ovum.  
(a) (b) (c) (d)
79. A Physical barrier method of family planning is temporary.  
R->Condom is made up of thin rubbers.  
(a) (b) (c) (d)
80. A chemical methods of family planning are temporary.  
R - It reduces locomotion of sperms.  
(a) (b) (c) (d)
81. Statement A - Intra Uterine method of family planning is permanent.  
Reason R - Copper T is included in it.  
(a) (b) (c) (d)
82. Statement A - contraceptive pills are taken orally.  
Reason R - Projesteron and estrogen are compoundly present in it.  
(a) (b) (c) (d)
83. Statement A - "Saheli" pills are contraceptive.  
Reason R - "Saheli" pills shoulds be taken once a day.  
(a) (b) (c) (d)
84. Statement A - "Saheli" pills are produced in CDRI lucknow.  
Reason R - "Saheli" pills have high contracaptive value.  
(a) (b) (c) (d)
85. Statement X - Two method of family planning a vasectomy and tubectomy are permanent barrier methods.  
Reason R - In which a small portion of vas deferens and fallopian tube are removed.  
(a) (b) (c) (d)
86. Statement A - In natual methods of family planning withdrawal or interruption coitus method is not completely reliable.  
Reasons R - At 14th day of menstruation cycle ovulation occur.  
(a) (b) (c) (d)
87. Statement -A-volunatary termination of pregnancy before foetus become viable in called MTP.  
Reason R-It is debatable in many countries.  
(a) (b) (c) (d)
88. Statement-A-Abortion is illegal in our country.  
Reason R-when conception is due to the rape.  
(a) (b) (c) (d)
89. Statement A-STDs is a major problem in our country.

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- Reason R-Seen more in 15-19 age group.  
 (a) (b) (c) (d)
90. Statement A-Culture of pathogenic microbes is main diagnostic test for STD.  
 Reason R-With the help of this microbes can be identified.  
 (a) (b) (c) (d)
91. Statement A-Medical examination is main diagnostic tests in STDs.  
 Reason R-Antibodies against HIV can be identified by ELISA test.  
 (a) (b) (c) (d)
92. Statement A-One of the diagnostic tests of STDs is PCR.  
 Reason R-With the help of suitable primer, the specific section of a gene of a pathogenic organism is multiplied.  
 (a) (b) (c) (d)
93. Statement A-Amniocentesis is also known as AFT.  
 Reason R-With the help of this the gender of the foetus can also be determined.  
 (a) (b) (c) (d)
94. Statement A-Number of couples are facing infertility.  
 Reason R-The problem can be both in male or female partner.  
 (a) (b) (c) (d)
95. Statement A-The method used to achieve pregnancy by artificial or partially artificial means is known as ART.  
 Reason R-ZVFT is one of them.  
 (a) (b) (c) (d)
96. In which of family planning methods the diagram includes?(image)   
 (a) Temporary methods  
 (b) Permanent method  
 (c) Chemical method  
 (d) Both a and c
97. To which organ the barrier of family planning shown in the diagram is attached.(image)   
 (a) Penis  
 (b) Vagina  
 (c) Uterus  
 (d) Cervix
98. To which organ the barrier of family planning shown in the diagram is attached.(image)   
 (a) Penis  
 (b) Vagina  
 (c) Uterus  
 (d) Cervix

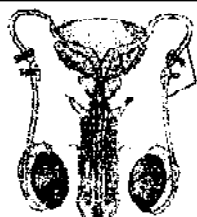
99. Which option is true for the device shown in the diagram for family planning?(image)

- (a) IVF
- (b) ART
- (c) IVDS
- (d) IFT



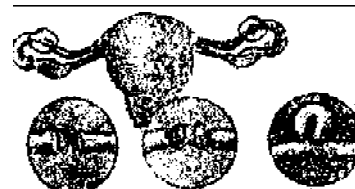
100. Name the cut portion shown in the diagram?(image)

- (a) Vas deference
- (b) fallopian tube
- (c) Epididymis
- (d) Urinogenital duct



101. Name the cut portion shown in the diagram?(image)

- (a) Vas deference
- (b) Fallopian tube
- (c) Epididymis
- (d) Urinogenital duct.



102. What is the function of copper-T

(CBSE PMT-2000, BHU-2002, AFMC-2010)

- (a) Checks mutation
- (b) Stop fertilization
- (c) Stops zygote formation
- (d) Stops obliteration of blastocoel

103. A contraceptive pill contains ...

(BVP-2002, AFMC-2009)

- (a) Progesterone and estrogen
- (b) Oxytocin
- (c) Relaxin
- (d) None of these

104. Trade name of weekly oral contraceptive pill is

(MP PMT 2004)

- (a) Mala
- (b) Shaheli
- (c) Mala-A
- (d) Mala-D

105. Amniocentesis involves the analysis of

(MP PMT-2004)

- (a) Amnion
- (b) Body fluid of amniotes
- (c) Amino acids of protein
- (d) Amniotic fluid

106. In amniocentesis the fluid is taken from

(Kerala CET-2002)

- (a) Foetal blood
- (b) Mother's blood
- (c) Body fluid of mother
- (d) Fluid surrounding foetus

107. Daily oral contraceptive pill is

(CBSE, PMT 2011)

- (a) Mala C
- (b) Mala M and Mala D
- (c) Mala A
- (d) Mala D

108. Cu ions released from copper releasing Intra uterine devices (IUDS) (CBSE PMT -2010)

- (a) Prevent ovulation
- (b) Make uterus unsuitable for implantation
- (c) Increase phagocytosis of sperms
- (d) (b) and (c) both



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109. Medical termination of the pregnancy (MTP) is considered safe up to how many weeks of pregnancy. (CBSE PMT-2011)  
 (a) Six weeks      (b) Eight weeks      (c) Twelve weeks      (d) Eighteen weeks
110. Which one of the following is the most widely accepted method of contraception in India at present? (CBSE PMT-2011)  
 (a) IUDs              (b) Cervical caps      (c) Tubectomy      (d) Diaphragms
111. Saheli is (Kerala PMT-2011)  
 (a) An oral contraceptive for females      (b) A surgical sterilization method for females  
 (c) A diaphragm for females                  (d) A surgical method of sterilization in male

**ANSWER KEY**

1	a	31	b	61	c	91	d
2	a	32	c	62	d	92	a
3	b	33	b	63	d	93	b
4	c	34	c	64	a	94	a
5	c	35	d	65	b	95	c
6	d	36	b	66	c	96	a
7	d	37	b	67	d	97	b
8	a	38	c	68	a	98	d
9	d	39	a	69	d	99	c
10	d	40	d	70	a	100	a
11	a	41	a	71	b	101	b
12	d	42	c	72	c	102	b
13	b	43	a	73	d	103	a
14	c	44	b	74	b	104	b
15	d	45	b	75	a	105	d
16	a	46	c	76	d	106	d
17	d	47	d	77	c	107	b
18	b	48	a	78	a	108	d
19	c	49	b	79	b	109	c
20	b	50	d	80	c	110	a
21	c	51	b	81	d	111	a
22	b	52	a	82	a		
23	d	53	c	83	d		
24	d	54	b	84	b		
25	c	55	c	85	a		
26	c	56	a	86	b		
27	a	57	d	87	d		
28	a	58	a	88	b		
29	c	59	b	89	c		
30	a	60	c	90	a		

## Unit-VII

### Chapter-8 Heredity and Variation

#### IMPORTANT POINTS

- **GENETICS:-** It is a branch of biology that deals with the study of heredity and variation.
- **Gregor Johann Mendel :-** (1822-1884) is called the Father of Genetics.
- The term genetics was first used by Willam Bateson.
- **Johansen (1909)** coined the term "genes" for Mendel's "factors".
- **Punnett square** is a checker board which was derived by R. C. Punnett.

#### **MENDELISM:-**

Mendel's laws of heredity were described in his paper "Experiments on plant Hybridization" which was published in the forth volume of Annual proceeding of naturalHistory Society of Brunn in 1865.

#### **BACK CROSS:-**

A cross of  $F_1$  hybrid with either of the two parents is known as back cross.

- ⇒ When  $F_1$  off springs are crossed with the dominant parents all the  $F_2$  off springs develop dominant character.
- ⇒ On the other hand when  $F_1$  hybrids are crossed with recessive parent, individuals with both the phenotypes appear in equal proportions. While both the crosses are known as backcross, the second one is specified as test cross.

#### **GENE INTERACTION :-**

Gene interaction is the modification of normal phenotypic expression of a gene due to either its alleles or non- allelic genes.

#### **Gene interaction is of two types:-**

- (i) Intragenic interaction
- (ii) Intergenic interaction

#### **Intragenic interaction :-**

In intragenic interaction , two alleles of a gene which are present on the same gene locus on the two homologous chromosomes ,react to produce modified phenotype.

- Eq :-
1. Incomplete dominance
  2. Codominance
  3. Multiple alleles

#### **Intergenic interaction :-**

It is the modified effect of a gene under the influence of a non - allelic gene.

- Eq :-
1. Complementary genes
  2. Supplementary genes

**Complementary genes :-**

If two genes present on different loci produce the same effect when present alone but interact to form a new trait when present together are called complementary genes.

**Complementary gene ratio is 9 : 7**

**Supplementary Genes :-**

Supplementary genes are two non allelic genes in which one type of gene produces its effect whether the other is present or not and the second gene produces its effect only in the presence of the first, usually forming new trait.

**Supplementary gene ratio is 9 : 3 : 4**

**INHERITANCE :-**

There are two types of inheritance

1. Qualitative inheritance / Monogenic inheritance
2. Quantitative inheritance / polygenic inheritance

**Monogenic inheritance :-**

- ⇒ A single dominant gene influences a complete trait.
- ⇒ Intermediate forms are not produced

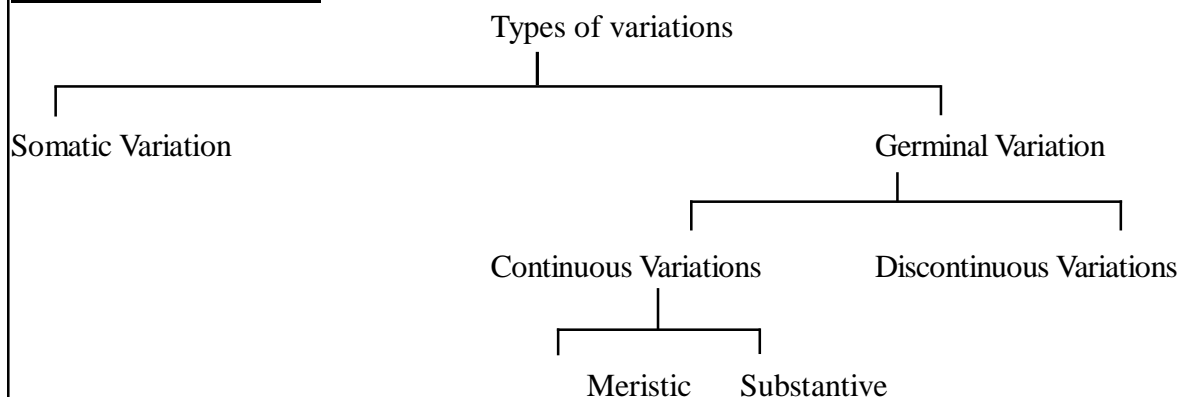
**Polygenic inheritance :-**

- ⇒ Full trait is shown when all dominant alleles present.
  - ⇒ Each dominant allele expresses a part or unit of the trait.
  - ⇒ Intermediate forms are produced
- Ex:- Human skin colour

**VARIATIONS :-**

- ⇒ Variations are differences found in morphological, physiological, Cytological and behavioural traits of individuals belonging to same species.
- ⇒ Hereditary variations are transmitted from generation to generation where as environmental variations are temporary and do not relate with last or next generation.

**Types of Variations :-**



**Somatic Variations :-**

Somatic Variations affect the somatic or body cells of the organisms and these die with the death of the individual and thus are non - inheritable.

Somatic variations are also called modifications of acquired variations because they are acquired by an individual during its life time.

They are formed due to three reasons

- 1. Environmental factors
- 2. Use and disuse of organs
- 3. Conscious efforts

**GERMINAL VARIATIONS :-**

Germinal variations are inheritable variations formed mostly in germinal cells which are either already present in the ancestor or develop as new due to mutations.

Germinal variations are of two types :-

1. Continuous variations
2. Discontinuous variation

**Continuous variations :-**

Continuous variations are also called recombinations. They are of two types:-

1. Meristic
2. Substantive.

**Meristic :-**

Meristic Variation influencing number of parts like number of grains in an ear of wheat.

**Substantive :-**

Substantive variation influencing appearance like height , colour, yield of milk, etc.,

**Discontinuous Variations :-**

Discontinuous Variations are mutations which are sudden , unpredictable inheritable variations not connected with the average by intermediate stages. Discontinuous are caused by chromosomal aberrations change in chromosome number and gene mutations.

**A.Garrod-** Father of human genetics & biochemical genetics.

- Garrod discovered first human metabolic genetic disorder which is called alkaptonuria (black urine disease.)
- He gave the concept "One mutant gene one metabolic block."
- Polygenic inheritance first described by Nilsson-Ehle in kernel colour of wheat.
- The inheritance of colour of skin in human studied by Davenport.
- Bleeder's disease (haemophilia ) was discovered by John Otto (1803).
- Colourblindness was discovered by Horner.
- Colourblindness is also called Daltonism.



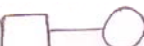
**Devices used in Human Genetical Studies:-**

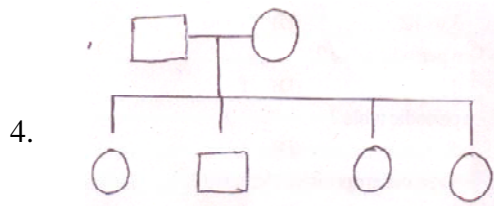
The study and analysis of human genetics is performed by many methods like pedigree analysis , statistical analysis and human karyotyping.

**Pedigree Analysis :-**

- Study of ancestral history of Man of transmission of genetic characters from one generation to next, is pedigree analysis.
- Dwarfism, albinism, Colour blindness haemophilia, etc., are genetically transmitted characters.
- To study and analysis them a pedigree of genetic facts and following symbols are used.

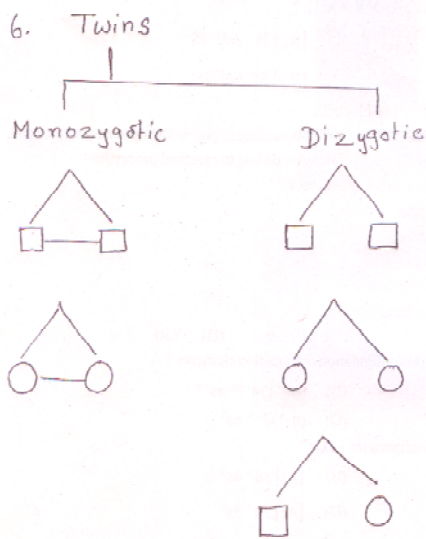
**Symbols Used in pedigree :-**



1.  - Normal Male
2.  - Normal female
3.  - Mating (Marriage)





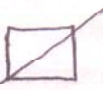





The siblings are indicated in chronological order of birth.

5.  Sex unspecified



7.  Affected female individual  
(or)  
Female with phenotype of interest.
8.  Affected Male individual  
(or)  
Male with phenotype of interest

9.  Sex unknown with phenotype of interest.
10.  Female heterozygous for recessive allele.
11.  Male heterozygous for recessive allele.
12.  Carrier female of sex linked recessive character or disease.
13.   Death of individuals.
14.  Abortion / still birth (sex unspecified )
15.  consanguineous marriage (Marriage between relatives)
16. Roman numerals in pedigree chart represent generation.

- (1) Genotype is  
 (A) Genetic composition of many organisms.  
 (B) Genetic composition of plastids.  
 (C) Genetic composition of germ cells.  
 (D) Genetic composition of an individual.
- (2) Mendelism is genetics of  
 (A) Haploids (B) Diploids (C) Prokaryotes (D) All the above
- (3) Which technique is used by Mendel for hybridization ?  
 (A) Emasculation (B) Bagging (C) Protoplast fusion (D) Both A & B
- (4) Phenotypic ratio 3:1 proves  
 (A) Dominance (B) Segregation  
 (C) Crossing over (D) Independent Assortment
- (5) What is the ratio of homozygous plants for both dominant characters in  $F_2$  of a Dihybrid cross ?  
 (A)  $1/16$  (B)  $3/16$  (C)  $4/16$  (D)  $9/16$
- (6) Which of the following is significance of dominance ?  
 (A) Organisms with dominant genes are more vital  
 (B) Harmful mutations are not expressed due to dominant gene  
 (C) Heterosis is due to dominant gene  
 (D) All the above

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- (7) From a single ear of corn, a farmer planted 200 kernels which produced 140 tall & 40 short plants. The genotypes of these off springs are most likely.  
 (A) TT ,tt      (B) TT , Tt , tt      (C) TT ,Tt      (D) Tt ,tt
- (8) A useful process for determining whether an individual is homozygous or heterozygous is  
 (A) cross - breeding      (b) self fertilization  
 (C) Back - crossing      (d) Test cross
- (9) Heterozygous tall plants were crossed with dwarf plants what will be the ratio of dwarf plants in the following progeny ?  
 (A) 50% (B) 25 %      (C) 75%      (D) 100%
- (10) Genetic recombinations occur through  
 (A) Mitosis & fertilization  
 (B) Mitosis & Meiosis  
 (C) Meiosis & fertilization  
 (D) None
- (11) Which of the following is the unit of inheritance ?  
 (A) Phenotype (B) Genotype      (C) Gene      (D) Genome
- (12) Allele is the  
 (A) Alternate trait of gene pair  
 (B) Total number of genes for a trait  
 (C) Total number of chromosomes  
 (D) Total number of chromosomes of a haploid set.
- (13) Types of phenotypes of F<sub>2</sub> generation of dihybrid cross ?  
 (A) 4      (B) 16      (C) 8      (D) 9
- (14) Cross XXYy × xxYy yields Xx YY:XxYy :Xxyy:xyyy offspring in the ratio of  
 (A) 0 : 3 : 1 : 1      (B) 1 : 2 : 1 : 0  
 (C) 1 : 1 : 1 : 1      (D) 1 : 2 : 1 : 1
- (15) Genes do not occur in pairs in  
 (A) Zygote      (B) Somatic cell  
 (C) Endosperm cell      (D) Gametes
- (16) Genotype - Phenotype concept was first produced by  
 (A) Bateson (B) Johannsen      (C) Sutton&Boveri (D) Punnet
- (17) 1: 1: 1: 1 ratio shows  
 (A) Monohybrid cross  
 (B) Dihybrid cross  
 (C) Back cross  
 (D) Dihybrid test cross
- 18) Test cross is  
 (A) Tt × Tt      (B) Tt × TT      (C) TT × TT      (D) Tt × tt
- (19) In a plant, gene "T" is responsible for tallness and its recessive allele "t" for dwarfness and "R" is responsible for red colour flower and its recessive allele "r" of white flower colour. A tall and red flowered plant with genotype TtRr crossed with dwarf and red flowered ttRr.  
 What is the percentage of dwarf - white flowered offspring of above cross ?  
 (A) 50%      (B) 6.25%      (C) 12.5 %      (D) 50 %

- (20) In *Mirabilis* plant the appearance of the pink hybrid (Rr) between cross of a red (RR) and white (rr) flower parent indicates  
 (A) Segregation (B) Dominance (C) Incomplete dominance (D) Heterosis
- (21) If there were only parental combinations in F<sub>2</sub> of a dihybrid cross then Mendel might have discovered ?  
 (A) Independent assortment (B) Atavism  
 (C) Linkage (D) Repulsion
- (22) Medelian dihybrid and dihybrid with linkage are respectively related with how many chromosomes?  
 (A) 1 pair & 2 pair (b) 2 pair & 1 pair  
 (C) 2 pair & 2 pair (d) 1 pair & 1 pair  
 In dihybrid with linkage, 2 pairs of genes located in similar homologous chromosomes
- (23) If distance between gene on chromosome is more, then gene shows :-  
 (A) Less Linkage (B) strong linkage  
 (C) weak linkage (D) incomplete linkage
- (24) Which of the following conditions represent a case of co-dominant genes ?  
 (A) A gene expresses itself, suppressing the phenotypic effect of its alleles.  
 (B) genes that are similar in phenotypic effect when present separately, but when together interact to produce a different trait.  
 (C) Alleles, both of which interact to produce effect in homozygous condition  
 (D) Alleles, both of which interact to produce an independent effect in heterozygous condition.
- (25) A gene located on y-chromosome and therefore, transmitted from father to son is known as  
 (A) Supplementary gene (B) Complementary gene  
 (C) Duplicate gene (D) Holandric gene
- (26) In multiple allele system a gamete possesses  
 (A) 2 alleles (B) 3 alleles  
 (C) one allele (D) several alleles
- (27) Blood grouping in humans is controlled by  
 (A) 4 alleles in which I<sup>A</sup> is dominant  
 (B) 3 alleles in which I<sup>A</sup> and I<sup>B</sup> are dominant  
 (C) 2 alleles in which none is dominant  
 (D) 3 alleles in which I<sup>A</sup> is recessive
- (28) Multiple alleles are present  
 (A) in different chromosomes  
 (B) at different loci on chromosomes  
 (C) at the same locus on homologous chromosome  
 (D) at the non homologous chromosome
- (29) what is called pleiotropism ?  
 (A) Phenomenon of multiple effect of a simple gene  
 (B) Phenomenon of multiple effect of multiple genes  
 (C) Phenomenon of multiple effect of multiple alleles  
 (D) all of the above



- (30) In a family, father has a blood group 'A' and mother has a blood group 'B', Children show 50 % probability for a blood group "AB" indicate that -  
 (A) Father is heterozygous  
 (B) Mother is heterozygous  
 (C) Either of parent is heterozygous  
 (D) Mother is homozygous
- (31) The longer the chromosome of an organism, the more genetic variability it gets from,  
 (A) Independent assortment (B) Linkage  
 (C) Crossing over (D) Mutation.
- (32) Which statement is incorrect about linkage ?  
 (A) It helps in maintaining the valuable traits of new varieties.  
 (B) It helps in forming new recombinants.  
 (C) Knowledge of linkage helps the breeder to combine all desirable traits in a single variety.  
 (D) It helps in locating genes on chromosome.
- (33) Genetic balance theory for sex determination in *Drosophila* was proposed by  
 (A) Prof. R. P. Roy (B) H. E. Warmbe  
 (C) C.B. Bridges (D) Mc. Chang
- (34) In *Bonellia* all larva are genetically and cytologically similar. In this worm mole individuals live in the uterus of female. If a particular larva settle near proboscis of an adult female, it becomes a male individuals. Larva develops free in water it becomes.  
 (A) Male individuals (B) Female individuals  
 (C) Inter Sex (D) Super female
- (35)  $F_2$  generation is produced as a result of  
 (A) Crossing  $F_1$  individuals with dominant parent  
 (B) Crossing  $F_1$  individuals with recessive parent  
 (C) Crossing one of the parental individual with dominant individual.  
 (D) Crossing  $F_1$  individuals amongst them selves.
- (36) Segregation of genes take place during which phase of cell division ?  
 (A) Metaphase (B) Anaphase (C) prophase (D) Embryo formation
- (37) A couple has four daughters. The percentage probability of fifth child to be a Daughter is.  
 (A) 10 (B) 50 (C) 75 (D) 100
- (38) In human being sex chromosomal complement is  
 (A) **XX - XY** (B) XX - XO (C) ZO - ZZ (D) ZW - ZZ
- (39) *Zea mays* has 10 pairs of chromosomes . Linkage groups present in it are  
 (A) 5 (B) 10 (C) 20 (D) 40
- (40) Crossing over during meiosis occurs between  
 (A) sister chromatids (B) Non sister chromatids  
 (C) Centromeres (D) Non homologous chromosomes
- (41) Incomplete linkage in *Drosophila* produces off springs with parental and non-parental combinations. State the percentage of non parental combination of *Drosophila*.  
 (A) 83% (B) 17 % (C) 15 % (D) 85 %

- (42) What does the term recombination describe ?  
 (A) Generation of non- parental gene combination  
 (B) Generation of parental gene combination  
 (C) Generation of internal gene combination  
 (D) All of the above
- (43) A cross between hybrid and a parent is known as  
 (A) Test cross (B) Back cross  
 (C) Monohybrid cross (D) Reciprocal cross
- (44) Checkerboard method of calculations was developed by  
 (A) Mendel (B) Bateson (C) Punnett (D) Morgan
- (45) Punnett square is used to know  
 (A) outcome of a cross (B) probable result of a cross  
 (C) Types of gametes (D) Number of gametes
- (46.) First generation after a cross is  
 (A) First filial generation (B) F<sub>1</sub> generation  
 (C) Second filial generation (D) Both (A) and (B)
- (47.) In humans, height shows a lot of variation. It is an example of  
 (A) Multiple alleles (B) Pleiotropic inheritance  
 (C) polygenic inheritance (D) False allelic inheritance
- (48) Meiosis produce 4 daughter cells but each daughter cell differ from one another because of  
 (A) Crossing over (B) Independent assortment  
 (C) Change in chromosome number (D) Both A & B
- (49) In T. H. Morgan's Experiment on Drosophila what will be the result when F<sub>1</sub> female flies are crossed with double recessive male flies ?  
 (A) 83% parental combinations  
     17% Recombinations  
 (B) 41.5 % parental combinations  
     58.5% recombinations  
 (C) 60% parental combinations  
     40 % recombinations  
 (D) 90 % parental combinations  
     10% Recombinations
- (50) which cross yielded a ratio of 7:1 :1:7 ?  
 (A) Test cross (Dihybrid) - Bateson and Punnett  
 (B) Test cross (Monohybrid) - Bateson and Punnett  
 (C) Test cross (Dihybrid) - Carrel Correns  
 (D) Test cross (Dihybrid) - Mendel & Morgan
- (51) When there is no Possibility of independent assortment of genes during gametogenesis then What Will be the real ratio of F<sub>2</sub> in dihybrid cross?  
 (A) 9 : 3 : 3 : 1 (B) 11 : 1 : 1 : 3  
 (C) 12 : 1 : 1 : 2 (D) 9 : 3 : 2 : 2
- (52) What was the expected ratio of F<sub>2</sub> by Bateson and Punnett in their dihybridization experiment done on Lathyrus odoratus?  
 (A) 9 : 3 : 3 : 1 (B) 11 : 1 : 1 : 3  
 (C) 12 : 1 : 1 : 3 (D) 9 : 3 : 2 : 2

- (53) What is incorrect statement Gynandromorphs ?  
 (A) Individuals who show male characters and female characters  
 (B) Individuals who show only female characters  
 (C) It happens due to less of X- chromosomes  
 (D) It happens due to binucleated eggs
- (54) What is Barr body ?  
 (A) One more than the number of X - chromosomes  
 (B) One more than the number of Y-chromosomes  
 (C) One less than the number of X - chromosomes  
 (D) Two less than the number of X - chromosomes
- (55) What is called Free martin ?  
 (A) Sterile male born along with a fertile female  
 (B) Sterile intersex born along with a fertile female  
 (C) Sterile super male born along with a intersex  
 (D) Sterile female born along with a fertile male
- (56) Out of the following , Find out the reason for occurrence of free martin in cattles ?  
 (A) Both the twins are connected by a common umbilical cord  
 (B) Gonad of the male develop earlier then those of the female  
 (C) Male hormones reach the female embryo and influence the development of male sex in the female embryo  
 (D) All of the above
- (57) In this group of plants male is heterogametic and female is homogametic type  
 (A) Gymnosperms (B) Bryophytes (C) pteridophytes (D) angiosperms
- (58) Name the Plant possessing two X chromosomes  
 (A) Humulus japonic (B) Dioscoria sinulate  
 (C) Flagellaria (D) Both (A) & (B)
- (59) State the mutant gene Which converts the male flowers into female flowers  
 In Maize plant  
 (A) TA TA (B) ta ta (C) TA Ta (D) Both (A) &(C)
- (60) By which gene sex is determind in Spinach ?  
 (A) Single gene "m" located in the X- chromosome  
 (B) Single gene "m" located in the Y- chromosome  
 (C) Single gene "t" located in the X- chromosome  
 (D) Single gene "t" located in the Y- chromosome
- (61) Which factor in nature causes discontinuous Variation in a population ?  
 (A) Recombination (B) Shuffling of parental genes  
 (C) Mutation (D) Geneflow
- (62) This is reversal of mutation  
 (A) Spontaneous mutation (B) Zygotic mutation  
 (C) Back mutation (D) Recessive mutation
- (63) Which condition among the following is lethal ?  
 (A)  $(2n-2)$  (B)  $(2n +2)$  (C)  $(2n +1)$  (D)  $(2n- 1)$



(72) Match the following

**Column I**

1. Johansen
2. Mendel
3. T. H. Morgan
4. Bateson & Punnett

- (A) (1 - d) (2 - c) (3 - b) (4 - a)  
 (C) (1 - c) (2 - d) (3 - b) (4 - a)

**Column II**

- a. Coined the term gene
- b. Crossing over in drosophila
- c. Linkage in lathyrus odoratus
- d. Law of segregation

- (B) (1 - a) (2 - d) (3 - b) (4 - c)  
 (D) (1 - b) (2 - d) (3 - a) (4 - c)

(73) Match the following

**Column I**

1. Single gene inheritance
2. Double gene inheritance
3. Test cross
4. Incomplete dominance

- (A) (1 - c) (2 - d) (3 - a) (4 - b)  
 (B) (1 - d) (2 - c) (3 - b) (4 - a)  
 (C) (1 - a) (2 - b) (3 - d) (4 - c)  
 (D) (1 - d) (2 - b) (3 - a) (4 - c)

**Column II**

- a. 1 : 1 : 1 : 1
- b. 1 : 2 : 1
- c. 3 : 1
- d. 9 : 3 : 3 : 1

(74) Match the following

**Column I**

1. Co-dominance
2. Polygenic inheritance
3. Multiple alleles
4. Pleiotropism

- (A) (1 - d) (2 - c) (3 - a) (4 - b)  
 (B) (1 - a) (2 - c) (3 - b) (4 - d)  
 (C) (1 - d) (2 - a) (3 - c) (4 - b)  
 (D) (1 - a) (2 - b) (3 - d) (4 - c)

**Column II**

- a. More than two optional forms of a gene
- b. Multiple effect of a single gene
- c. Quantitative inheritance
- d. Both gene express their expression independently

(75) Match the following

**Column I**

**Blood groups**

1. A
2. B
3. AB
4. O

- (A) (1 - a) (2 - b) (3 - c) (4 - d)  
 (B) (1 - c) (2 - a) (3 - b) (4 - d)

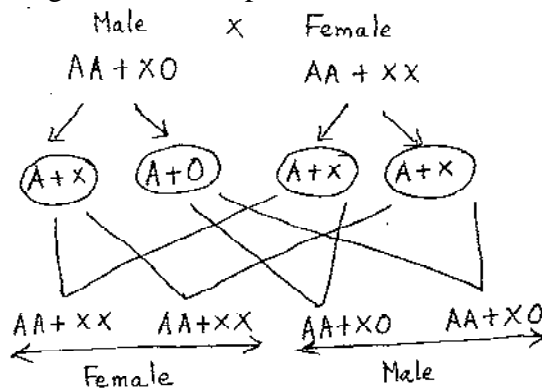
**Column II**

**Possible Genotypes**

- (a)  $I^B I^B, I^B i$
- (b)  $ii$
- (c)  $I^A I^A, I^A i$
- (d)  $I^A I^B$

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- (C) (1 - c) (2 - b) (3 - d) (4 - a)  
 (D) (1 - c) (2 - a) (3 - d) (4 - b)
- (76) The cross between heterozygous A blood group mother with B blood group father heterozygous).What will be the expected blood group of First filial generation.  
 (A) AB group (B)A group (C) B group (D) O group  
 (E) All of the above
- (77) What will be expected blood groups in the off spring when there is a cross between AB blood group mother and heterozygous B blood group father ?  
 (a) 25 % AB group  
     25 % A group  
     50 % B group  
 (b) 50 % AB group  
     25 % A group  
     25 % B group  
 (c) 25% AB group  
     50% O group  
     25 % A group  
 (d) 25 % O group  
     50 % B group  
     25 % A group
- (78) Which law of Mendel can be explained on chromosomal basis of inheritance ?  
 (A) Law of dominance  
 (B) Law of segregation  
 (C) Law of independent assortment  
 (D) All the above
- (79) What does the chart & given below represent ?

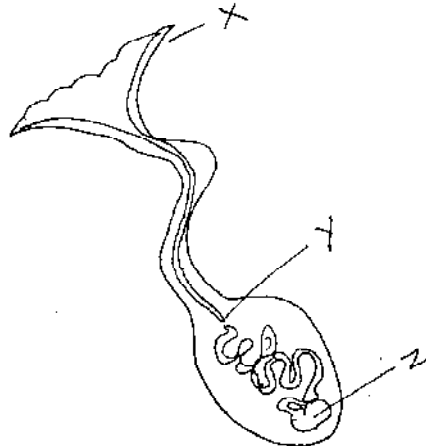


- (A) XX - XY type of sex determination  
 (B) XX - XO type of sex determination  
 (C)  $xy_+^0$  -  $xx_+^0$  type of sex determination  
 (D) XO - XX Type of sex determination

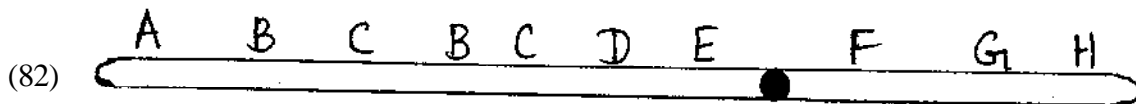
(80) The value of  $X/A$  is given in column A and sex of the fly is written in column B. Match the following :-

- | Column I | Column II                |
|----------|--------------------------|
| 1. 1     | (a) Normal Male          |
| 2. 1.5   | (b) super male Sterile   |
| 3. 0.67  | (c) inter sex            |
| 4. 0.33  | (d) super Female sterile |
| 5. 0.5   | (e) Normal Female        |
- A. (1 - a) (2 - d) (3 - c) (4 - e) (5 - b)  
 B. (1 - e) (2 - d) (3 - c) (4 - b) (5 - a)  
 C. (1 - b) (2 - a) (3 - c) (4 - d) (5 - e)  
 D. (1 - e) (2 - c) (3 - d) (4 - a) (5 - b).

(81) Out of the marked portions X, Y and Z, in which region the male worm develop ?

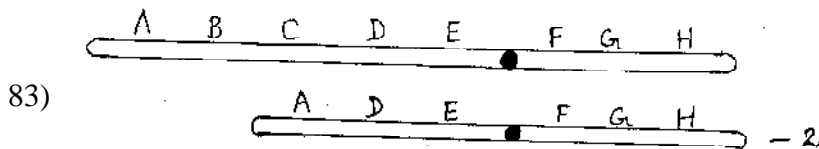


- (A) X                      (B) Y                      (C) Z                      (D) All the three regions



Which kind of structural abnormality is seen in the above chromosome?

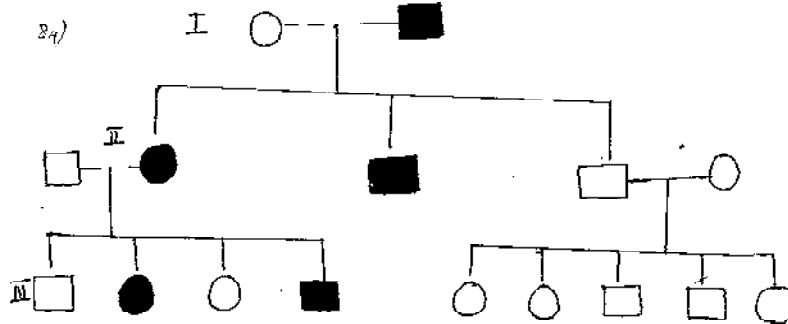
- (A) Terminal deletion                      (B) Duplication (Tandem)  
 (C) Duplication (Reverse)                      (D) Inversion



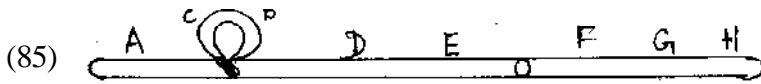
Name the abnormality seen in chromosome number - 2

- (A) Interstitial Deletion  
 (B) Terminal Deletion  
 (C) Tandem Duplication  
 (D) Reverse Duplication

(84) What does the following pedigree chart represent ?

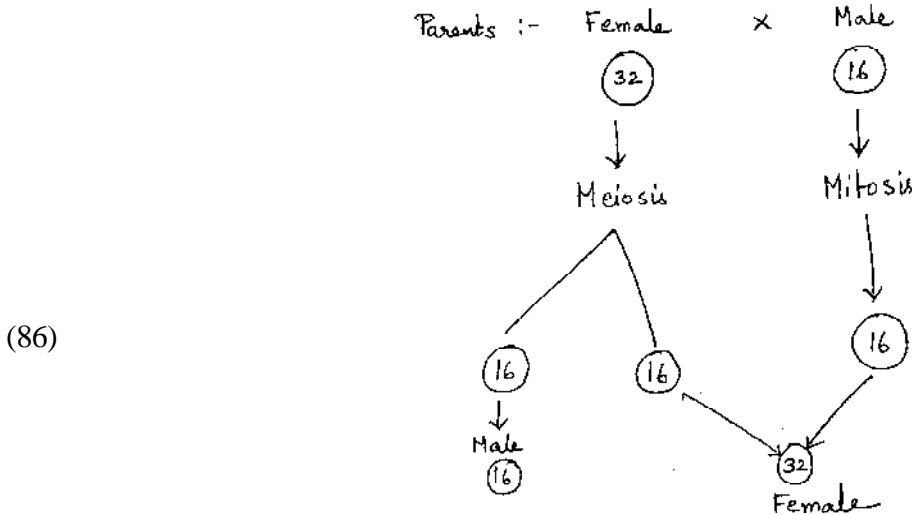


- (A) Pedigree of sex - influenced disorder
- (B) Pedigree of sex - linked disorder
- (C) Pedigree of polydactylous in man
- (D) Pedigree of gene mutation



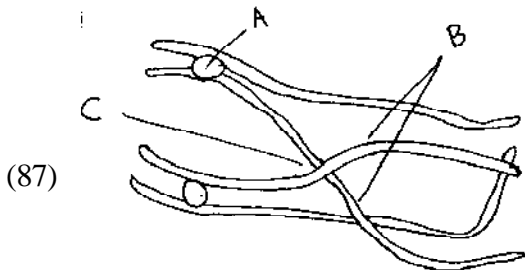
What kind of chromosomal aberrations is seen in the given diagram?

- (A) Deletion
- (B) Duplication
- (C) inversion
- (D) Translocation



What kind of sex determination is seen in the given chart?

- (A) Sex determination in drosophila
- (B) Sex determination in honey bee
- (C) Sex determination in moth
- (D) Sex determination in butterfly

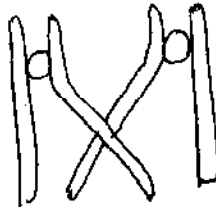


What do A, B, C represent in the given diagram?

- (A) Centromere, chromatids chiasma
- (B) Chromatid, chiasma, centromere
- (C) Centromere, chiasma, chromatid
- (D) Chromatid, chiasma centromere



(88) What does the diagram represent ?



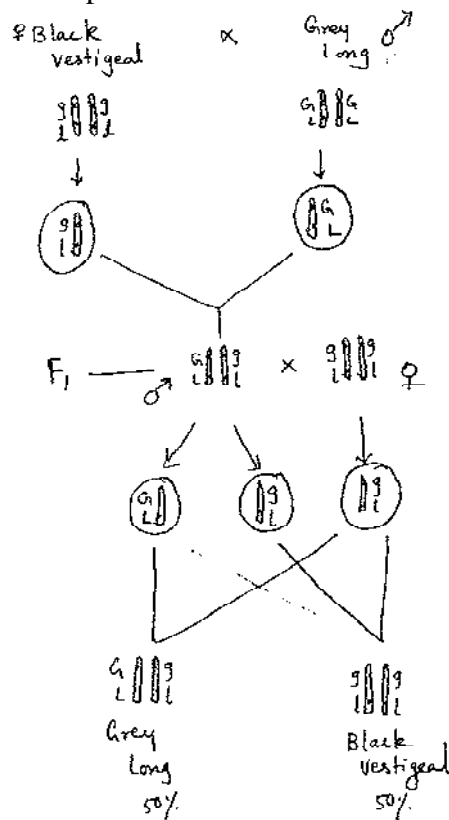
- (A) synapsis Zygotene  
 (B) crossing over, Diplotene  
 (C) Tetrads, Pachytene  
 (D) Terminalization, Diakinesis

(89) Whose karyotype is represented below ?



- (A) Female Drosophila  
 (B) Male Drosophila  
 (C) Intersex Fly  
 (D) Super female fly

(90) What does the above cross represent ?



- (A) Incomplete linkage  
 (B) Complete linkage  
 (C) Crossing over  
 (D) Evolution

**Assertion & Reason Type Questions**

The Questions consist of two statements each - Assertion (A) and Reason (R).

To answer these questions choose any one of the following four responses.

(A) If both (A) and (R) are true and (R) is the correct explanation of (A)

(B) If both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) If (A) is true but (R) is false

(D) If both (A) and (R) are false.

- (91) Assertion (A) - chromosomes undergo Segregation and independent assortment.  
Reason (R) - During mitosis, their number is reduced into half.  
(A) (B) (C) (D)
- (92) Assertion (A) - There is parallelism between the behavior of chromosome and Mendelian factors.  
Reason (R) - Genes are located on chromosomes  
(A) (B) (C) (D)
- (93) Assertion (A) :- Crossing over leads to genetic variation.  
Reason (R) :- Crossing over causes recombination of characters.  
(A) (B) (C) (D)
- (94) Assertion (A) :- pedigree is same in colourblindness and haemophilia  
Reason (R) :- Colourblindness and haemophilia are X-linked recessive traits.  
(A) (B) (C) (D)
- (95) Assertion (A) :- Child is known as Thalassaemia major  
Reason (R) :- Effective gene from both the parents (Thalassaemia minor) passed to the child  
(A) (B) (C) (D)
- (96) Assertion (A) :- Human beings are not suitable breeding experiments to Study the inheritance of human traits.  
Reason (R) :- In Human beings controlled hybridization is not possible  
(A) (B) (C) (D)
- (97) Assertion (A) :- strong linkage allow the variations to come into population  
Reason (R) :- Linkage does not maintain parental gene combination  
(A) (B) (C) (D)
- (98) Assertion (A) :- Alkaptonuria is not an inborn error in metabolism  
Reason (R) It is caused by crossing over.  
(A) (B) (C) (D)
- (99) Assertion (A) :- colchicine is the stimulator of mitosis  
Reason (R) :- In karyotype chromosomes are arranged in ascending order of size.  
(A) (B) (C) (D)
- (100) Assertion (A) :- HbA HbS is a carrier of sickle cell anaemia  
Reason (R) :- Sickle cell anaemia is a recessive character caused by the recessive genes HbS HbS  
(A) (B) (C) (D)

**Questions From Competitive Exams**

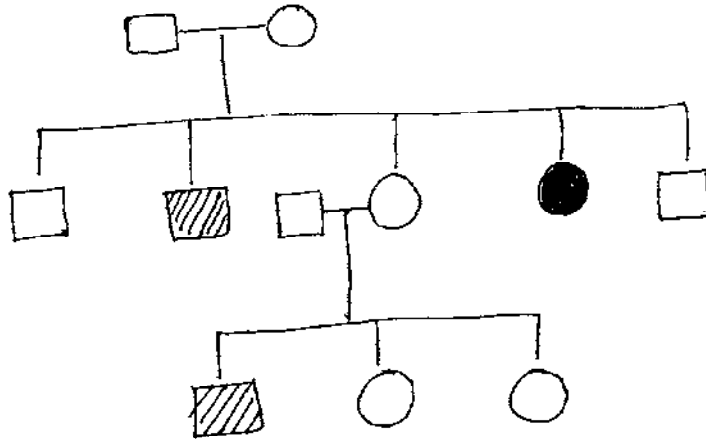
- (101) The genes Controlling the seven characters of a pea plant studied by Mendel are now known to be located on how many different chromosomes? **AIPMT - 2003**  
 (A) Seven (B) Six (C) Five (D) Four
- (102) Which one of the following traits of garden pea studied by Mendel was a recessive feature? **AIPMT - 2003**  
 (A) Axial flower position (B) Green Seed colour  
 (C) Green pod colour (D) Round Seed shape
- (103) Down's Syndrome is caused by an extra copy of chromosome number 21. What percent age of off spring produced by an affected mother and a normal father? **AIPMT - 2003**  
 (A) 100% (B) 75% (C) 50% (D) 25%
- (104) Lack of independent assortment of two genes A and B in fruitfly the Drosophila is due to  
 (A) Repulsion (B) Recombination (C) Linkage (D) Crossing over
- (105). A male human is heterozygous for autosomal genes A and B and is also hemizygous for haemophilic gene h. What proportion of his sperms will be abh? **AIPMT - 2004**  
 (A) 1/8 (B) 1/32 (C) 1/16 (D) 1/4
- (106). In a plant, red fruit (R) is dominant over yellow fruit (r) and tallness (T) is dominant over shortness (t).  
 If a plant with RRTt genotype is crossed with a plant that is rrtt. **AIPMT - 2004**  
 (A) 25% will be tall with red fruit  
 (B) 50% will be tall with red fruit  
 (C) 75% will be tall with red fruit  
 (D) All the offspring will be tall with red fruit.
- (107) A normal woman, whose father was colour blind is married with normal man. The sons would be **AIPMT - 2004**  
 (A) 75% Colour blind (B) 50% colour blind  
 (C) all normal (D) all colourblind
- (108).The recessive genes located on X - chromosome of humans are always **AIPMT-2004**  
 (A) Lethal (B) Sub - Lethal  
 (C) expressed in males (D) expressed in females
- (109). In order to find out the different types of gametes produced by a pea plant having the genotype AaBb it should be crossed to a plant with the genotype **AIPMT - 2004**  
 (A) AABB (B) AaBb (C) aabb (D) aaBB
- (110). A woman with normal vision, but whose father was colourblind, marries a colourblind man. **AIPMT - 2004**  
 Suppose that the fourth child of this couple was a boy. This boy  
 (A) May be colourblind or may be of normal vision  
 (B) Must be colourblind  
 (C) Must have normal colour vision  
 (D) Will be partially colourblind since he is heterozygous for the colourblind mutant allele.

- (111). Which of the following is not a hereditary disease? **AIPMT - 2004**  
 (A) Cystic Fibrosis (B) Thalassaemia (C) Haemophilia (D) Cretinism
- (112). Haemophilia is more commonly seen in human males than in human females because **AIPMT - 2004**  
 (A) a greater proportion of girls die in infancy  
 (B) this disease is due to a Y- linked recessive mutation  
 (C) this disease is due to an X - linked recessive mutation  
 (d) this disease is due to an X- linked dominant mutation
- (113). A woman with 47 chromosomes due to 3 copies of chromosome 21 is characterized by **AIPMT - 2005**  
 (A) Super Femaleness (B) Triploidy  
 (C) Turner's Syndrome (D) Down's Syndrome
- (114). A man and a woman, who do not show any apparent signs of a certain inherited disease, have Seven Children (2 daughters and 5 sons). Three of the Sons suffer from the given disease but none of the daughters affected. Which of the following mode of inheritance do you suggest for this disease? **AIPMT - 2005**  
 (A) Sex - linked dominant  
 (B) Sex - linked recessive  
 (C) Sex - limited recessive  
 (D) Autosomal dominant
- (115). Which one of the following is an example of polygenic inheritance ? **AIPMT - 2006**  
 (A) Skin colour in humans  
 (B) Flower colour in *Mirabilis jalapa*  
 (C) Production of male honey bee  
 (D) Pod shape in garden pea
- (116). Phenotype of an organism is the result of **AIPMT - 2006**  
 (A) genotype and environmental interactions  
 (B) mutations and linkages  
 (C) Cytoplasmic effects and nutrition  
 (D) environmental changes and sexual dimorphism
- (117). How many different gametes will be produced by a plant having the genotype AABbCC? **AIPMT - 2006**  
 (A) Two (B) Three (C) Four (D) Nine
- (118). In Mendel's experiments with garden pea, round seed shape (RR) was dominant over wrinkled seeds (rr), Yellow cotyledon (YY) was dominant over green cotyledon (yy). What are the expected Phenotypes in the F<sub>2</sub> generation of the cross RRYYY x rryy?  
 (A) Round Seeds with yellow cotyledons, and wrinkled seeds with yellow cotyledons  
 (B) Only round seeds with green cotyledons  
 (C) Only wrinkled seeds with yellow cotyledons  
 (D) Only wrinkled seeds with green cotyledons
- (119) Test cross involves **AIPMT - 2006**  
 (A) Crossing between two genotypes with dominant trait  
 (B) Crossing between two genotypes with recessive trait  
 (C) Crossing between two F<sub>1</sub> hybrids  
 (D) Crossing the F<sub>1</sub> hybrid with a double recessive genotype

- (120). Cri - du -chat Syndrome in humans is caused by the **AIPMT - 2006**  
 (A) trisomy of 21st chromosome  
 (B) Fertilization of an XX egg by a normal Y - bearing sperm  
 (C) loss of half of the short arm of chromosome 5  
 (D) loss of half of the long arm of chromosome 5
- (121). If a colourblind woman marries a normal visioned man, their sons will be **AIPMT - 2006**  
 (A) all colourblind  
 (B) all normal visioned  
 (C) one - half colourblind and one - half normal  
 (D) three - fourths colourblind and one - fourth normal
- (122). In the hexaploid wheat, the haploid (n) and basic (X) numbers of chromosomes are **AIPMT - 2007**  
 (A) n = 21 and X = 21  
 (B) n = 21 and X = 14  
 (C) n = 21 and X = 7  
 (D) n = 7 and X = 21
- (123). Inheritance of skin colour in humans is an example of **AIPMT - 2007**  
 (A) Point Mutation  
 (B) Polygenic inheritance  
 (C) Codominance  
 (D) Chromosomal aberrations
- (124). In pea plants, yellow seeds are dominant to green, If a heterozygous yellow seeded plant is crossed with a green seeded plants, what ratio of yellow and green seeded plants, would you expect in F<sub>1</sub> generation? **AIPMT - 2007**  
 (A) 9 : 1                      (B) 1 : 3                      (C) 3 : 1                      (D) 50 : 50
- (125). A human male produces sperms with the genotypes AB , Ab , aB , ab pertaining to two diallelic characters in equal proportions. What is the corresponding genotype of this person? **AIPMT - 2007**  
 (A) AaBB                      (B) AABb                      (C) AABB                      (D) AaBb
- (126). Which one of the following conditions in human is correctly matched with its chromosomal abnormality / linkage ? **AIPMT - 2008**  
 (A) Erythro blastosis foetalis - X - linked  
 (B) Down's syndrome - 44 autosomes +XXY  
 (C) Kline Felter's syndrome - 44 autosomes +XXY  
 (D) Colour blindness - Y - linked.

(127). Study the pedigree chart given below what does it show?

**AIPMT - 2009**



- (A) Inheritance of a Condition like phenyl ketonuria as an autosomal recessive trait  
 (B) The pedigree chart is wrong as this is not possible  
 (C) Inheritance of recessive sex - linked disease like haemophilia
- (128). The most popularly known blood grouping is the ABO grouping. It is named ABO and not ABC, because "O" in it refers to having **AIPMT - 2009**  
 (A) Overdominance of this type on the genes for A and B types  
 (B) One antibody only - either anti - A or anti - B on the RBCs  
 (C) no antigens A and B on RBCs  
 (D) other antigens besides A and B on RBCs
- (129). Sickle cell anemia is **AIPMT - 2009**  
 (A) Caused by substitution of Valine by glutamic acid in the beta globin chain of haemoglobin.  
 (B) Caused by a change in a single base pair of DNA  
 (C) Characterized by elongated sickle like RBCs with a nucleus  
 (D) An autosomal dominant trait.
- (130). Which one of the following can not be explained on the basis of Mendel's law of dominance? **AIPMT - 2009**  
 (A) The discrete unit controlling a particular character is called a factor  
 (B) Out of one pair of factors one is dominant, and the other recessive.  
 (C) Alleles do not show any blending and both the characters recover as such in  $F_2$  generation.  
 (D) Factors occur in pairs
- (131). The genotype of a plant showing the dominant phenotype can be determined by **AIPMT - 2010**  
 (A) test cross (B) dihybrid cross (C) pedigree analysis (D) Back Cross
- (132). Select the correct statement from the ones given below with respect to dihybrid cross.  
 (A) Tightly linked genes on the same chromosomes show higher recombinations  
 (B) Genes far apart on the same chromosome show very few recombinations  
 (C) Genes loosely linked on the same chromosome show similar recombinations  
 (D) Tightly linked genes on the same chromosome show very few recombinations

(133). ABO blood groups in humans are controlled by the gene I. It has three alleles -  $I^A$ ,  $I^B$  and  $i$ . Since there are 3 different alleles six different genotypes are possible. How many phenotypes occur?

**AIPMT - 2010**

- (A) Three                      (B) One                      (C) **Four**                      (D) Two

(134) Which one of the following symbols and its representation used in human pedigree analysis is correct?

**AIPMT - 2010**



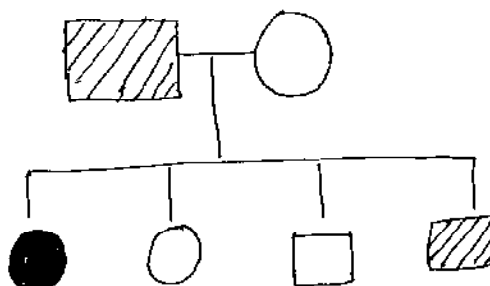
(A) = Mating between relatives

(B) = unaffected male

(C) = unaffected female

(D) = affected male

135. Study the pedigree chart of a certain family given below and select the correct conclusion which can be drawn for the character



(A) The female parent is heterozygous

(B) The parent could not have had a normal daughter for this character

(C) The trait under study could not be colour blindness

(D) The male parent is homozygous dominant

136. Which one of the following conditions correctly describes the manner of determining the sex?

**AIPMT - 2011**

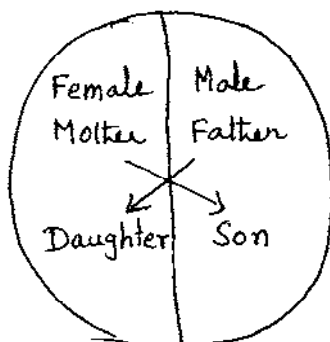
(A) Homozygous sex chromosomes (ZZ) determine female sex in birds

(B) XO type of sex chromosomes determine male sex in grasshopper

(C) XO condition in humans as found in Turner's syndrome, determines female sex

(D) Homozygous sex chromosomes (XX) produce male in Drosophila

137. Mutations can be induced with **AIPMT - 2011**  
 (A) Infra red radiations (B) IAA (C) Ethylene (D) gamma radiations
138. Test cross in plants or in Drosophila involves crossing **AIPMT - 2011**  
 (A) between two genotype with recessive trait  
 (B) between two  $F_1$  hybrids  
 (C) the  $F_1$  hybrid with a double recessive genotype  
 (D) between two genotypes with dominant traits
139. Which one of the following conditions of the Zygotic cell would lead to the birth of a normal human female child? **AIPMT - 2011**  
 (A) Two X Chromosomes  
 (B) Only One Y Chromosomes  
 (C) Only One X Chromosomes  
 (D) One X chromosome and One Y chromosome
140.  $F_2$  generation in a Mendelian cross showed that both genotypic and phenotypic ratios are same as  $1 : 2 : 1$ . It represents in case of **AIPMT - 2012**  
 (A) Co - Dominance  
 (B) Dihybrid Cross  
 (C) Monohybrid cross with complete dominance  
 (D) Monohybrid cross with incomplete dominance
141. A normal - Visioned man whose father was colourblind, marries a woman whose father was also colourblind. They have their first child as a daughter. What are the chances that this child would be colourblind?  
 (A) 100% (B) 0% (C) 25% (D) 50%
142. A test cross is carried out to **AIPMT - 2012**  
 (A) determine the genotype of a plant at  $F_1$   
 (B) Predict whether two traits are linked  
 (C) assess the number of alleles of a gene  
 (D) determine whether two species or varieties will breed successfully.
143. Represented below is the inheritance pattern of a certain type of trait in humans. Which one of the following conditions could be an example of this pattern?



- (A) Phenyl ketonuria (B) Sickle Cell anaemia  
 (C) Haemophilia (D) Thalassemia
144. A cross between  $AaBB \times aaBB$  yields a genotypic ratio of **AIPMT - 1990**  
 (A)  $1 AaBB : 1 aaBB$   
 (B)  $1 AaBB : 3 aaBB$



- (C) 3 AaBB : 1 aaBB  
 (D) All AaBb
145. Which of the following is non - heritable? **AIPMT - 1995**  
 (A) Point mutation (B) Chromosomal mutation  
 (C) Gene mutation (D) Somatic mutation
146. Dihybrid cross proves the law of **AIPMT - 1992**  
 (A) segregation (B) Purity of gametes  
 (C) Dominance (D) Independent assortment
147. How many types and in what ratio the gametes are produced by a dihybrid heterozygous? **AIPMT - 1992**  
 (A) 4 types in the ratio of 9 : 3 : 3 : 1  
 (B) 2 types in the ratio of 3 : 1  
 (C) 3 types in ratio of 1: 2: 1  
 (D) 4 types in the ratio of 1: 1: 1 : 1
148. In a cross between a pure tall plant with green pod and a pure short plant with yellow pod. How many short plants are produced in F<sub>2</sub> generation out of 16? **AIPMT - 94**  
 (A) 1 (B) 3 (C) 4 (D) 9
149. In a dihybrid cross between AABB and aabb the ratio of AABB, AABb, aaBb, aabb in F<sub>2</sub> generation is  
 (A) 9 : 3 : 3: 1 (B) 1: 1: 1: 1 (C) 1: 2: 2: 1 (D) 1 : 1 : 2 : 2
150. The allele which is unable to express its effect in the presence of another is called **AIPMT - 1991**  
 (A) Co - dominant  
 (B) Supplementary  
 (C) Complementary  
 (D) Recessive

**ANSWER KEY**

1 - D	11 - C	21 - C	31 - C	81 - C	91 - C
2 - B	12 - A	22 - B	32 - B	82 - B	92 - A
3 - D	13 - A	23 - B	33 - C	83 - A	93 - A
4 - B	14 - B	24 - D	34 - B	84 - C	94 - A
5 - A	15 - D	25 - D	35 - D	85 - C	95 - A
6 - B	16 - B	26 - C	36 - B	86 - B	96 - A
7 - B	17 - D	27 - B	37 - B	87 - A	97 - D
8 - D	18 - D	28 - C	38 - A	88 - B	98 - D
9 - A	19 - C	29 - A	39 - B	89 - B	99 - D
10 - C	20 - C	30 - C	40 - B	90 - B	100- B
41 - B	51 - B	61 - C	71 - C		
42 - A	52 - A	62 - C	72 - B		
43 - B	53 - B	63 - A	73 - A		
44 - C	54 - C	64 - C	74 - A		
45 - B	55 - D	65 - A	75 - D		
46 - D	56 - D	66 - B	76 - E		
47 - C	57 - D	67 - B	77 - A		
48 - D	58 - D	68 - A	78 - C		
49 - A	59 - B	69 - C	79 - B		
50 - A	60 - A	70 - B	80 - B		

101 - D	111 - D	121 - A	131 - A	141 - B
102 - B	112 - C	122 - C	132 - D	142 - A
103 - C	113 - D	123 - B	133 - C	143 - C
104 - C	114 - B	124 - D	134 - A	144 - A
105 - A	115 - A	125 - D	135 - A	145 - A
106 - B	116 - A	126 - C	136 - B	146 - A
107 - B	117 - A	127 - A	137 - D	147 - D
108 - C	118 - A	128 - C	138 - C	148 - C
109 - C	119 - D	129 - B	139 - A	149 - C
110 - A	120 - C	130 - C	140 - D	150 - D



## UNIT-VII

### Chapter-6. Molecular Basis of Inheritance

#### IMPORTANT POINTS

**DNA** :- Deoxy ribonucleic acid is the largest biomolecule which has polynucleotide chains with specific arrangement of nitrogen bases that possess coded information of Cryptogram of a large number of hereditary traits

#### History

1. Friedrich Miescher - isolated nucleic acid and named nuclein
2. Zacharis - Found nuclein to be restricted to chromatin
3. Alt man - named nuclein of nucleic acid
4. Fisher - discovered purine and pyrimidine bases
5. Chargoff - found purine and pyrimidine content of DNA to be equal with  $A = T$  and  $G = C$  ( = equal to )
6. Franklin - found DNA to be helix
7. Watson Crick & Wilkins - Double helical model of DNA
8. Linus Pauling - a Nobel Laureate for unravelling protein structure

#### Functions of DNA :-

1. Autocatalytic Function :- DNA direct its own biosynthesis at the time of DNA replication
2. HeteroCatalytic Function :- Directing Synthesis of another biochemical is called heterocatalytic function

Ex :- Synthesis of RNA over DNA template

In 1948 Beadle and Tatum proposed one-gene one enzyme hypothesis which states that a gene controls metabolic machinery of the organism through synthesis of an enzyme. This laid foundation of biochemical genetics

One - Gene and one Polypeptide hypothesis was proposed by Yanofsky (1965).

It states that a structural genes specifies the synthesis of a single polypeptide

Ex :- Haemoglobin is made of two  $\alpha$  and two  $\beta$  chains (polypeptides)

Two separate genes play vital role in synthesis of two different ( $\alpha$  and  $\beta$ ) Chains.

Cistron - In biochemical genetics the term gene is replaced by cistron

Regulatory gene - Which controls the functioning of structural genes

Structural gene - Produces biochemicals required for cellular machinery

Split gene - In this coding, bases are not continuous but are interrupted by non- coding sequences These are respectively called as exons and introns Functional m - RNA is formed by splicing removal of intron portions and fusion of coding parts / Exon portions

A Few eukaryotic genes are without introns. They are called exonic genes ( = not split genes) /

Processed genes Ex :- histone genes, interferon genes

**House - Keeping genes (or) Constitutive genes:-** Those genes which are always in action because their products are always required for cellular activities

Ex :- ATPase, Enzymes of glycolysis

**Non -Constitutive genes :-** Genes which can be switched on or off as per requirements

**Types of Non Constitutive genes :-**

(i) **Inducible - non - constitutive genes :-**

Remain repressed but are switched on in the presence of an inducer chemical

Ex :- Lac - operon

(ii) **Repressible - non Constitutive genes :-**

Remain active till switched off by a chemical

Ex :- Tryptophan operon

**Single copy genes :-** They are represented only once in the which genome

**Repeated genes :-** Genes having more than one copy in the same genome are called repeated genes Ex :- histone genes

**Cryptic genes :-** Genes which are not expressed during the life cycle of an organism

**Overlapping genes :-** Reported in  $\phi$  x 174 Virus Three of its genes (E, B and K) overlap others

**Transposons / Jumping genes :-** DNA segments Which can pass from one place to another in the genome

Transposons may take strong promoters to new sites or cause reshuffling of gene Segments Which lead to change in gene expression

Ex :- Proto oncogene  $\rightarrow$  Oncogene

**Tumour Suppressing genes :-** Checks unrestricted cell cycles

**DNA finger printing :-**

**Dermatoglyphics** : Derma - Skin, glyphein - to carve

Dermatoglyphics is the science of finger printing

It deals with study of patterns of ridges of the skin finger, palms, toes and soles

Dermatoglyphics is used in establishing identity of individuals

It also can indicate genetic abnormalities

Conventional finger prints can be altered through surgery

DNA finger printing / gentic finger printing is never be changed being it is the process of analysis VNTR from samples of DNA of a person

1. Name the conjugated protein used as genetic material in living cells  
 (A) Glyco protein                      (B) Nucleo protein                      (C) Metallo protein                      (D) Lip oprotein
2. Who supported Griffith effect by molecular explanation ?  
 (A) Hershay and chase                      (B) Watson, crick Ninenberg  
 (C) Avery , Mc Carty and Macleod                      (D) Griffith and Avery

3. Synthesis of nucleic acids always takes place in  
 (A) 3<sup>1</sup> - 5<sup>1</sup> direction (B) 5<sup>1</sup> - 3<sup>1</sup> direction (C) Both ways (D) in any direction
4. DNA Chain initiation phase during replication is  
 (A) formation of stepping stone (B) Activation of deoxy ribonucleotides  
 (C) Formation of Okazaki fragments (C) Formation of replication fork stage
5. What is called Griffith effect ?  
 (A) DNA transcription (B) RNA translation  
 (C) Bacterial transformation (D) Bacterial transduction
6. Genetic information is carried by the long chain molecules which are made up of  
 (A) Amino acids (B) Nucleotides (C) Chromosomes (D) Enzymes
7. By which bonds the purine & pyrimidine pairs of Complementary Strands of DNA held together?  
 (A) H - bonds (B) O - bonds (C) C - bonds (D) N - bonds
8. State the nature of the 2 Strands of DNA duplex.  
 (A) identical & Complementary (B) Anti parallel & complementary  
 (C) Disimilar & non - complementary (D) Anti parallel & Non - complementary
9. The code AUG stands for  
 (A) Glycine (B) Methionine (C) N-formyl methionine (D) Alanine
10. A Sequence of three Consecutive bases in a t- RNA molecule which Specifically binds to a complementary Codon Sequence in m - RNA is known as  
 (A) Triplet Codon (B) Non - Sense Codon  
 (C) Anti Codon (C) Termination Codon
11. A Codon is made up of  
 (A) Single nucleotide (B) two nucleotides (C) three nucleotides (D) Four nucleotides
12. Nucleus of a cell is the site of Synthesis of  
 (A) DNA (B) m - RNA (C) t - RNA (D) All
13. DNA replication requires  
 (A) DNA polymerase only (B) DNA polymerase and ligase  
 (C) Ligase only (D) RNA polymerase
14. The enzyme involved in transcription is  
 (A) RNA polymerase (B) DNA polymerase I (C) DNA polymerase II (D) DNA polymerase III
15. Enzymes needed for formation of replication fork  
 (A) RNA polymerase and DNA polymerase I (B) Helicase and gyrase  
 (C) Hexokinase and aldolase (D) Ligase and endo nuclease
16. Okazaki fragments are Synthesized on  
 (A) Leading strands of DNA only (B) Lagging Strands of DNA only  
 (C) Leading and Lagging Strands (D) Complementary DNA Strand

17. Which of the following is used in DNA multiplication?  
 (A) RNA polymerase (B) DNA endonuclease (C) DNA exonuclease (D) DNA Polymerase
18. t - RNA attaches aminoacid at its  
 (A) 3<sup>1</sup> end (B) 5<sup>1</sup> end (C) Anticodon (D) Loop
19. DNA acts as a template for synthesis of  
 (A) RNA (B) DNA (C) Both 'a' and 'b' (D) Protein
20. Antiparallel strand in DNA is due to  
 (A) Disulphide linkage (B) Hydorgen bond (C) Phosphodiester bond (D) Ionic bond
21. Multiplication of DNA is called  
 (A) Translation (B) Replication (C) Transduction (D) Transcription
22. Which is the smallest RNA ?  
 (A) r RNA (B) m RNA (C) t - RNA (D) nuclear RNA
23. Genetic information are transfered from nucleus to cytoplasm of cell through  
 (A) DNA (B) RNA (C) Lysosomes (D) Anticodon
24. The information from RNA to DNA are transfered by which process  
 (A) Replication (B) Transcription (C) Translation (D) Reverse transcription
25. Which statement is correct ?  
 (A) Degeneracy of code is related to third member of codon  
 (B) Single codon, codes for more than one aminoacid  
 (C) In codon first two bases are more specific  
 (D) In codons third base is wobble  
 (E) code is universal  
 (A) A,B,C,D,E (B) A, B, D (C) A., C, D (D) A, C, D, E
26. DNA molecule has uniform diameter due to ?  
 (A) Double stranded  
 (B) Presence of phosphate  
 (C) Specific base pairing between purine and pyrimidine  
 (D) Specific base pairing between purine and purine
27. In a transcription unit promotor is said to be located towards  
 (A) 3<sup>1</sup> end of structural gene (B) 5<sup>1</sup> end of structural gene  
 (C) 5<sup>1</sup> end of template strand (D) 3<sup>1</sup> end of template strand
28. In DNA replication the primer is  
 (A) A Small deoxyribonucleotide polymer  
 (B) A small ribonucleotide polymer  
 (C) Helix destalilizing protein  
 (D) Enzyme taking part in joining nucleotides of new strands

29. Non - sense codons take part in
- (A) formation of unspecified aminoacids
  - (B) Terminating message of gene controlled protein synthesis
  - (C) Releasing t-RNA from polynucleotide chain
  - (D) Conversion of sense DNA in to non-sense one
- 30, select the correct sequence of following in DNA replication
- (A) single stranded binding proteins - Helicase - Topoisomerase - DNA polymerase
  - (B) Helicase - single stranded binding proteins -Topoisomerase - DNA polymerase
  - (C) Helicase - DNA polymerase - Topoisomerase - Single stranded binding proteins
  - (D) Helicase - Topoisomerase - DNA polymerase - Single stranded binding proteins
31. Which of the following enzymes can detect and correct the wrong inserted base during DNA replication ?
- (A) DNA polymerase - I
  - (B) DNA polymerase - II
  - (C) Primase
  - (D) Ligase
32. Which one is a ribozyme ?
- (A) Helicase
  - (B) Ribonuclease - P
  - (C) Peptidyl transferase
  - (D) Both (B) & (C)
33. Which of the following pairs is not correctly matched ?
- (A) Recombinant DNA - DNA forming by union of segments of DNA from different Sources
  - (B) Purines - Nitrogenous bases Cytosine , thymine and Uracil
  - (C) ATP - The principal energy carrying compound in the cell
  - (D) r-RNA - RNA molecules found in ribosomes
34. Which one of the following pairs is correctly matched ?
- (A) Ribosomal RNA - Carries amino acids to the site of protein synthesis
  - (B) Transcription - Process by which protein is synthesized
  - (C) Translation - Process by which mRNA carries the information from nucleus to ribosomes
  - (D) Anticodon - Site of t-RNA that binds to the m-RNA
35. Which is not the step of translation ?
- (A) Initiation
  - (B) Replication
  - (C) Elongation
  - (D) Termination
36. The enzyme amino acyl t-RNA-synthetase facilitates.
- (A) Joining two neighbouring amino acids on ribosomes
  - (B) A doption of amino acids by a t-RNA molecule
  - (C) Insertion of amino acyl t-RNA into the ribosome sites
  - (D) Transfer of amino acyl t-RNA from the ribosomal 'A' site to 'P' site

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37. state the anticodon of initiation codon of protein synthesis  
(A) UAC                      (B) UUU                      (C) CAU                      (D) AUG
38. Which is the energy source for the process of elongation ?  
(A) ATP                      (B) GTP                      (C) Creatine-PO<sub>4</sub>                      (D) All the above
39. What does a gene consist of ?  
(A) Promoter    (B) Initiation site & termination site  
(C) coding sequence    (D) All the above
40. Name the enzymes needed for lactose Catabolism in E.coli ?  
(A)  $\beta$  - galactosidase, permease transacetylase                      (B)  $\beta$  - galactosidasee Lactase, transacetylase  
(C)  $\beta$  - galactosidase, lactase, permease                      (D) Lactase, permease, transacetylase
41. What does operon contain ?  
(A) Regulator gene + promotor gene  
(B) Operator gene + structural gene  
(C) Regulator gene + promotor gene structural gene  
(D) Regulator gene + promotor gene + operator gene + structural gene
42. Select correct match with respect to lac-operon model ?  
(A) Active repressor + inducer  $\rightarrow$  Inactive repressor  
(B) Active repressor + corepressor  $\rightarrow$  Inactive repressor  
(C) Inactive repressor + inducer  $\rightarrow$  Active repressor  
(D) Inactive repressor + corepressor  $\rightarrow$  Active repressor
43. In relation of lac operon in E-coli , Which protein is not regulated by the repressor ?  
(A) Tryptophan    (B) galactosidase  
(C) Lactose permease    (D) Transacetylase
44. Which is not correct regarding the activity of helicase during DNA replication ?  
(A) Cuts hydrogen bomds    (B) Requires ATP  
(C) separates DNA strands    (D) Stabilizes single strands
45. Which of the following enzyme is not produced by E. coli during lactose catabolism ?  
(A)  $\beta$  - galactosidase    (B) Thiogalactoside translacetylase  
(C) Lactose dehydrogenase    (D) Lactose permease
46. Which is the incorrect statement regarding HGP ?  
(A) HGP is an Indian scientific research project  
(B) In 1990, the Project was initiated  
(C) A working draft of the genome was announced in 2000  
(D) In February 2001, the analysis of the working draft was published
47. Humans have approximately \_\_\_\_\_ times more genes than E.coli  
(A) 8    (B) 15    (C) 100    (D) 50



48. Which of the following is not according to the Chargoff's rule ?  
 (A)  $A = T$                       (B)  $C = G$                       (C)  $A + G = T + C$                       (D)  $A + T / G + C = 1$
49. Select the correct answer / answers from the following
1. Ligase :- Joins short segments of DNA together
  2. DNA Polymerase :- cuts DNA at specific sequence
  3. Helicase :- Breaks the hydrogen bonds between complementary pairs during DNA replication
  4. Gyrase :- Joins weak hydrogen bonds between complementary pairs
- (A) 1, 2, 3 and 4, are correct  
 (B) 1 and 2 are correct, 3 and 4 are false  
 (C) 1 and 3 are correct, 2 and 4 false  
 (D) 1, 2, 3 are correct, 4 is false
50. DNA replication in eukaryotes is  
 (A) Unidirectional with many origin  
 (B) Bidirectional with many origin  
 (C) Unidirectional with single origin  
 (D) Bidirectional with single origin
51. Amino acids lysine, serine and arginine are coded by how many codons ?  
 (A) 6, 4, and 3 respectively  
 (B) 4, 2 and 2 respectively  
 (C) 6 codons  
 (D) 4 codons
52. Which of the following amino acid is coded by 3 codons ?  
 (A) serine                      (B) Proline                      (C) Tryptophan                      (D) Isoleucine
53. How many nucleotides make one Okazaki segment in eukaryotes ?  
 (A) 1000-1500                      (B) 100-200                      (C) 5000                      (D) Not fixed
54. Which of the following enzymes help in the process of formation of phosphodiester bond during reverse transcription ?  
 (A) DNA - dependant RNA polymerase  
 (B) DNA dependant DNA polymerase  
 (C) RNA - dependant RNA polymerase  
 (D) RNA - dependant DNA polymerase
55. The two strands of a DNA molecule are separated and one of them is analysed for its  $A + T / G + C$  ratio, This is found to be 0.2 What is the  $A + T / G + C$  ratio of the other strand  
 (A) 0.02                      (B) 0.08                      (C) 0.8                      (D) 0.2
56. DNA replication in lagging strand of most of the eukaryotic organisms is  
 (A) conservative and continuous                      (B) semi conservative but discontinuous  
 (C) conservative and semi - discontinuous                      (D) semi conservative but continuous

57. How many bases consist in an average gene ?

- (A) 3, 00, 000      (B) 3000      (C) 4, 00, 000      (D) 4000

58. Match the following using salient features of Human genome project

A

B

- |                          |                                |
|--------------------------|--------------------------------|
| (P) Less than 2 % genome | (i) 3 billion nucleotide bases |
| (Q) Chromosome 1         | (ii) 231 genes                 |
| (R) Y chromosome         | (iii) 2968 genes               |
| (S) Human genome         | (iv) codes for protein         |

- |  |
|--|
| (A) (P - iv)      (Q - iii)      (R - ii)      (S - i) |
| (B) (P - iv)      (Q - ii)      (R - iii)      (S - i) |
| (C) (P - iv)      (Q - i)      (R - ii)      (S - iii) |
| (D) (P - i)      (Q - iii)      (R - iv)      (S - ii) |

59. State the use of molecular medicine ?

- (A) Improves diagnosis of diseases  
 (B) Used as gene therapy  
 (C) Used to understand several disease like Alzheimer's Parkinsons diseases etc.,  
 (D) All the above

60. Among the following which is used for separation of DNA fragments ?

- (A) centrifugation      (B) Cell fractionation      (C) Cell homogenation      (D) Electrophoresis

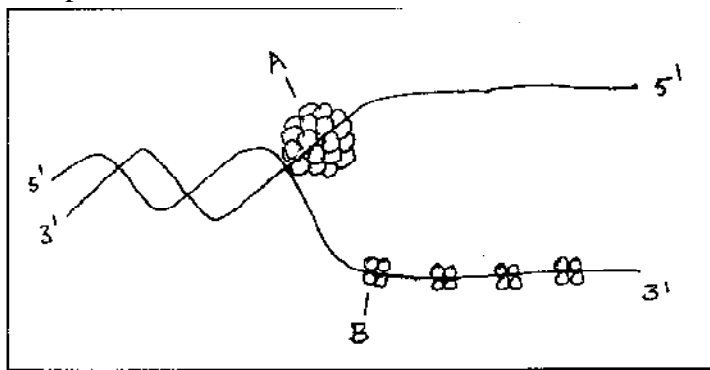
61. In Which of the following DNA not directly involved ?

- (A) Replication      (B) Transcription      (C) Translation      (D) Transformation

62. Transcription begins when one of the following enzymes binds to promotor site.

- (A) DNA polymerase (B) RNA polymerase      (C) helicase      (D) Gyrase

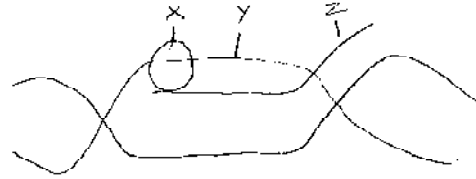
63. What dose A & B represent ?



- (A) Gyrase , Helicase  
 (B) Double Stranded Protein, Helicase  
 (C) Helicase, Single strand binding protein  
 (D) Topoisomerase Helicase

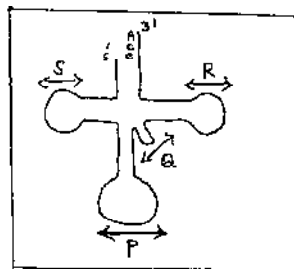
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64. State the process and mention the labelled portion.



- |                               |  |
|-------------------------------|--|
| (A) Process of Translation    | - X-RNA Polymerase<br>- Y-DNA Template<br>- Z-m RNA Transcript     |
| (B) process of Transcription  | - X-RNA Polymerase<br>- Y-DNA Template<br>- Z- RNA Transcript      |
| (C) process of Translocation  | - X-DNA polymerase<br>- Y- Template<br>- Z- Transcript             |
| (D) Process of Transformation | - X - DNA polymerase<br>- Y - RNA template<br>- Z - RNA transcript |

65. What do P, Q, R and S regions of t RNA ?



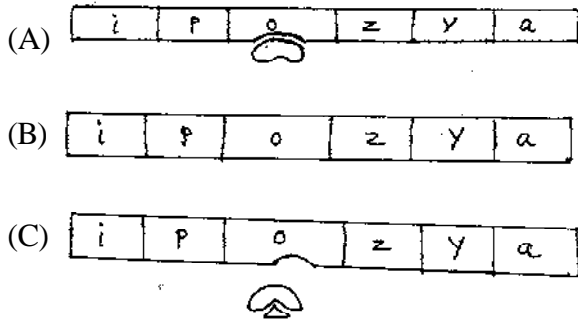
- |   |   |
|---|---|
| (A) P - Anticodon loop<br>Q - Variable loop<br>R - T ψ c loop<br>S - D Loop | (B) P. D Loop<br>Q - T ψ c loop<br>R - Variable loop<br>S - Anticodon loop  |
| (C) P - T ψ c loop<br>Q - D loop<br>R - Anticodon loop<br>S - Variable loop | (D) P - Anticodon Loop<br>Q - T ψ c loop<br>R - D loop<br>S - Variable loop |



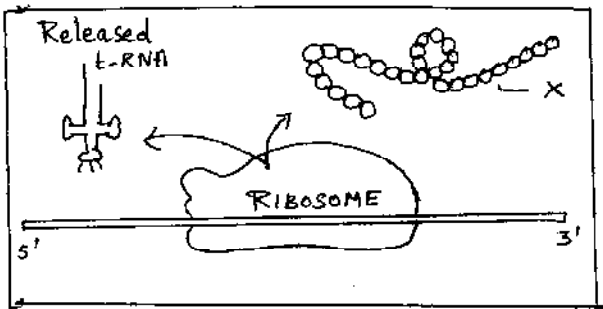
Which state is represent by the above model

- |                                   |                                  |
|-----------------------------------|----------------------------------|
| (A) Repressed state of lac operon | (B) Inactive state of Lac operon |
| (C) Active state of Lac operon    | (D) Induced state of Lac operon  |

67. When does the structural genes of Lac operon switch on ?



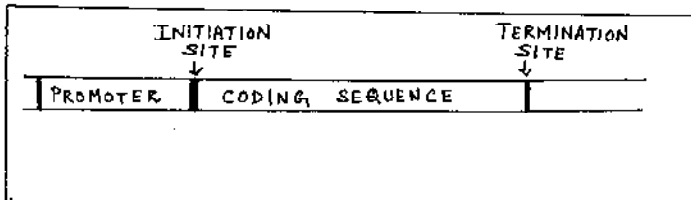
68.



What does X represent in the above diagram

- (A) Released polypeptide chain
- (B) Released 3D protein molecule
- (C) Released secondary protein
- (D) Released tertiary protein

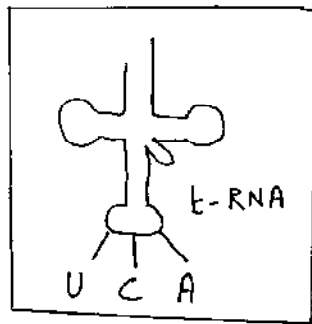
69.



What does 'X' represent

- (A) gene
- (B) segment of DNA
- (C) segment of DNA coding for specific protein
- (D) Both A & C

70. Write the codon for the anticodon on the t - RNA



- (A) AGU
- (B) UGU
- (C) UGA
- (D) ACU

The question consist of two statements each Assertion (A) and Reason (R)

So answer these question choose any one of the following four responses

(A) If both (A) and (R) one true and (R) is the correct explanation of (A)

(B) If both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) If (A) is true but (R) is false

(D) If both (A) and (R) as false

71. Assertion (A) Lac - operon is an inducible system  
Reason (R) - Transcription occurs in the presence of lactose  
(A) (B) (C) (D)
72. A :- Operon concept was given by Hershey and chase  
R :- Separation of DNA fragments are done by centrifugation technique  
(A) (B) (C) (D)
73. A :- DNA is cut into Sections by using restriction endonucleases  
R :- Ligase is used to join DNA nucleotides  
(A) (B) (C) (D)
74. A:- Abraham Lincon has been analyzed for evidence of a genetic disorder called Marfan's syndrome  
R :- An additional benefit of DNA fingerprint technology is the diognos is of inherited disorders  
(A) (B) (C) (D)
75. A :- Helicase is called unwindase  
R :- DNA helix uncoils and splits into single strands by breaking of hydrogen bonds between complementary bases  
(A) (B) (C) (D)
76. A :- Formation of Lagging strand is slow  
R :- Formation of lagging strand begins bit later than that of leading strand  
(A) (B) (C) (D)
77. A Doublet codons are inadequate for 20 types of aminoacids  
R One aminoacid can be coded by many codons in triplet gentic code  
(A) (B) (C) (D)
78. A:- Mutations effect protein structure and function  
R :- Only one changed codon may be mis sense when it changes insertion of one aminoacid  
(A) (B) (C) (D)
79. A:- Catching criminals could become easier and quicker using DNA fingerprints  
R :- The process begins with blood or cell sample from which DNA is extracted  
(A) (B) (C) (D)
80. A :- Dr. Hargobind Khorana Synthesized one gene of yeast containing 77 nucleotides  
R:- Nirenberg synthesized more complex gene in rabbit which contains 650 nucleotides.  
(A) (B) (C) (D)

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81. In the genetic code dictionary how many codons are used to code for all the 20 essential amino-acids?  
(AIPMT - 2003)  
(A) 20                      (B) 64                      (C) 61                      (D) 60
82. What would happen if in a gene encoding polypeptide of 50 aminoacids 25th codon (UAU) is mutated to UAA ?  
(AIPMT - 2003)  
(A) A Polypeptide of 24 aminoacids will be formed  
(B) Two polypeptides of 24 and 25 aminoacids will be formed  
(C) A polypeptide of 49 aminoacids will be formed  
(D) A polypeptide of 25 aminoacids will be formed
83. Which one of the following triplet codes, is correctly matched with its specificity for an aminoacid in protein synthesis or as 'start' or 'stop' codon ?  
(A) UCG - start      (B) UUU - stop  
(C) UGU - Leucine    (D) UAC - Tyrosine
84. What does "Lac" refer to in what we call the lac operon ?  
(AIPMT - 2003)  
(A) Lactose              (B) Lactase  
(C) Lac insect          (D) The number 1,00,000
85. The following ratio is generally constant for a given species  
(AIPMT - 2004)  
(A)  $A + G / C + T$     (B)  $T + C / G + A$   
(C)  $G + C / A + T$     (D)  $A + C / T + G$
86. During transcription if the nucleotide sequence of the DNA strand that is being coded is ATACG then the nucleotide sequence in the mRNA would be  
(AIPMT - 2004)  
(A) TATGC      (B) T C T G G      (C) U A U G C      (D) U A T G C
87. Which one of the following makes use of RNA template to synthesize DNA  
(AIPMT - 2005)  
(A) DNA polymerase    (B) RNA polymerase  
(C) Reverse transcriptase    (D) DNA dependant RNA polymerase
88. Protein synthesis in an animal cell occurs  
(AIPMT - 2005)  
(A) only on the ribosomes present in cytosol  
(B) only on ribosomes attached to the nuclear envelope and endoplasmic reticulum  
(C) On ribosomes present in the nucleolus as well as in cytoplasm  
(D) on ribosomes present in cytoplasm as well as in mitochondria
89. E coli cells with a mutant z gene of the lac operon cannot grow in medium containing only lactose as the source of energy because  
(AIPMT - 2005)  
(A) the lac operon is constitutively active in these cells  
(B) they cannot synthesize functional beta galactosidase  
(C) in the presence of glucose E Coli cell do not utilize lactose  
(D) they cannot transport lactose from the medium into the cell
90. Aminoacid Sequence in protein synthesis is decided by the sequence of  
(AIPMT - 2006)  
(A) r RNA                      (B) t- RNA                      (C) m RNA                      (D) c DNA

91. Antiparallel strands of a DNA molecule means that (AIPMT - 2006)  
 (A) One strand turns clockwise  
 (B) One strand turns anticlockwise  
 (C) The phosphate groups of two DNA strands , at their ends share the same position  
 (D) The phosphate groups at the start of two DNA strands are is opposite position (Pole).  
 (AIPMT-2006)
92. Polysome is formed by (AIPMT - 2008)  
 (A) a ribosome with several subunits  
 (B) ribosomes attached to each other in a linear arrangement  
 (C) several ribosomes attached to a single m RNA  
 (D) many ribosomes attached to a strand of endoplasmic reticulum
93. In the DNA Molecule (AIPMT - 2008)  
 (A) the proportion of adenine in relation to thymine varies with the organism  
 (B) there are two strands which run antiparallel one in  $5^1 \rightarrow 3^1$  direction and other in  $3^1 \rightarrow 5^1$   
 (C) the total amount of purine nucleotides and pyrimidines nucleotides is not always equal  
 (D) there are two strands which run parallel in the  $5^1 - 3^1$  direction
94. Semiconservative replication of DNA was first demonstrated in (AIPMT - 2009)  
 (A) Escheirchia coli (B) streptococcus pneumoniae  
 (C) Salmonella typhimurium (C) Drosophila melanogaster
95. Whose experiments cracked the DNA and discovered unequivocally that a genetic code is a “triplet” (AIPMT - 2009)  
 (A) Hershey and chase (B) Morgan and sturtevant  
 (C) Beadle and Tatum (D) Nirenberg and Mathai
96. Select the two correct statement out of the four statement given below about “Lac opern”(AIPMT -2010)  
 (i) Glucose or galactose may bind with the repressor and inactivate it  
 (ii) In the absence of lactose the repressor bind with the operator region  
 (iii) The Z -gene codes for permease  
 (iv) This was elucidated by Francois Jacob and Jacques Monod  
 The correct statements are  
 (A) ii and iii (B) i and iii (C) ii and iv (D) i and ii
97. Which one of the following does not follow the central dogma of molecular biology ? (AIPMT - 2010)  
 (A) Pea (B) Mucor (C) Chlamydomonas (D) HIV
98. The lac opern consists of (AIPMT - 2010)  
 (A) four regulatory genes only  
 (B) One regulatory gene and three structural genes  
 (C) Two regulatory genes and three structural genes  
 (D) three regulatory genes and three structural genes

99. The 3<sup>1</sup> - 5<sup>1</sup> Phosphodiester linkages inside a potynucleotide chain serve to join (AIPMT - 2010)  
 (A) One DNA strand with the other DNA strand  
 (B) One nucleoside with another nucleoside  
 (C) One nucleotide with another nucleotide  
 (D) One nitrogen base with pentose sugar
100. Ribosomal RNA is actively synthesized by  
 (A) Lysosomes (B) nucleolus (C) nucleoplasm (D) ribosomes
101. If one strand of DNA has the nitrogenous base sequence as ATCTG, What would be the complementary RNA strand Sequence (AIPMT - 2012)  
 (A) TTAGU (B) UAGAC (C) AACTG (D) ATCGU
102. Initiation codon of protein synthesis (in eukaryotes) is (AIIMS - 1986)  
 (A) GUA (B) GCA (C) CCA (D) AUG
103. Semiconservative DNA replication using <sup>15</sup>N was demonstrated by (AIIMS -1994)  
 (A) Meselson (B) Taylor (C) Meselson and stahl (D) Hershey and chase
104. In operan concept, the operator gene combines with (AIIMS -1986)  
 (A) Regulator protein to switch off structural gene transcription  
 (B) Regulator protein to switch on structural gene transcription  
 (C) Inducer to switch off structural gene transcription  
 (D) Regulator gene to switch off structural gene transcription
105. Termination of polypeptide chain is brought about by  
 (A) UUG , UAG and UCG  
 (B) UAA , UAG and UGA  
 (c) UUG , UGC and UCA  
 (D) UCG , GCG and ACC
106. RNA that picks up specific aminoacid from amino acid pool of cytoplasm to carry it to ribosome during protein synthesis is  
 (A) t RNA (B) m RNA  
 (C) r RNA (D) g RNA
107. Correct sequenceof code transfer during polypeptide formation is (AIIMS -1999)  
 (A) DNA , mRNA , t RNA and amino acids  
 (B) DNA , t RNA , r RNA and m RNA  
 (C) m RNA , t RNA , DNA and amino acids  
 (D) r RNA , DNA ,m RNA and t RNA
108. Best method to determine paternity is  
 (A) Protein analysis  
 (B) chromosome counting  
 (C) gene counting  
 (D) DNA finger printing



109. DNA is copied from m-RNA molecule with help of  
 (A) Restriction enzyme  
 (B) Reverse transcriptase  
 (C) DNA polymerase  
 (D) Adenosine deaminase
110. Match the column
- | I                        | II                                      |
|--------------------------|---|
| (P) t- RNA               | (i) Joining of aminoacids               |
| (Q) m - RNA              | (ii) Transfer of genetic information    |
| (R) r - RNA              | (iii) Nucleolar organising region       |
| (S) Peptidyl transferase | (iv) Passage of aminoacids to ribosomes |
- (A) ( P - iv) , (Q-ii), (R - iii) (S - i)  
 (B) (P - i), (Q - iv), (R - iii), (S - ii)  
 (C) (P - i), (Q - ii) (R - iii), (S - iv)  
 (D) (P - i), (Q - iii), (R-ii), (S - iv)
111. Nucleotide arrangement in DNA can be seen by  
 (A) X - ray crystallography  
 (B) Electron microscope  
 (C) Ultra centrifuge  
 (D) Light microscope
112. Pneumococcus experiment proved that  
 (AFMC - 1993)  
 (A) Bacteria do not reproduce asexually  
 (B) Bacteria undergo binary fission  
 (C) DNA is genetic material  
 (D) RNA may sometimes control a production of DNA and protein
113. A DNA nucleotide chain has A G C T T C G A sequence The nucleotide sequence of other chain would be  
 (A) T C G A A G C T  
 (B) G C T A A G C T (AFMC - 1993)  
 (C) T A G C A T A T  
 (D) G A T C C T A G
114. A functional unit in synthesis of protein is (MPPMT - 1994)  
 (A) Lysosome (B) Peroxisome (C) Polysome (D) Dictyosome
115. VNTR is employed for (AMU - 2002)  
 (A) Protoplasmic culture (B) DNA finger printing  
 (C) Regulation of plant growth hormones (D) Enhancing photosynthesis in desert plant
116. Out of 64 codons 61 code for 20 types of aminoacids It is due to (CBSE - 2002)  
 (A) Overlapping genes (B) Degeneracy of genetic code  
 (C) Wobbling of codons (D) Universality of codons
117. Okazaki fragments are joined by enzyme (Kerala 2005)  
 (A) DNA helix (B) DNA ligase  
 (C) DNA polymerase II (D) RNA polymerase II

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118. Heat killed pathogenic cells and live non pathogenic cells are mixed and injected into Mice

The result would be

(Kerala - 2001)

(A) Mice develop disease and die

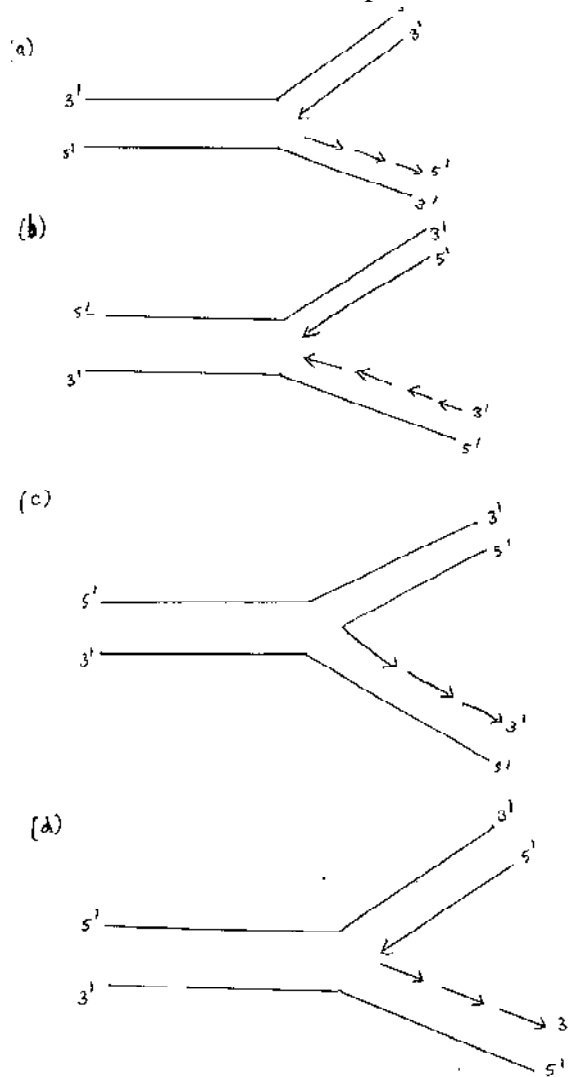
(B) Mice die without developing disease

(C) Mice remain healthy

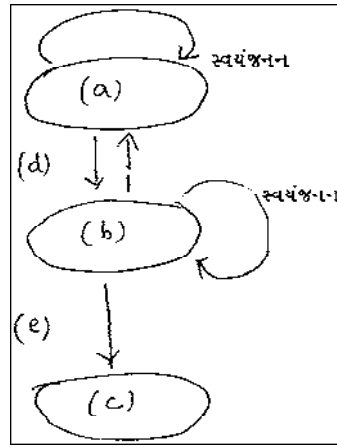
(D) 50% mice develop disease and die

119. Which one represents the correct manner of DNA replication ?

(AIIMS - 2003)



120. Diagram represents “central dogma” of molecular biology chose correct combination of labelling  
(Kerala - 2001)



- (A) a - protein b - RNA - c - DNA, d- Translation, e- Transcription
- (B) a - DNA, b - RNA, c- Protein, d- Transcription, e - Translation
- (C) a - RNA, b- DNA, c- protein, d - Transcription, e - Translation
- (D) a - Transcription, b- Translation, c- Protein, d - DNA, e - RNA

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**ANSWER KEY**

1	B	31	A	61	C	91	D
2	C	32	D	62	B	92	C
3	B	33	B	63	C	93	B
4	D	34	D	64	B	94	A
5	C	35	B	65	A	95	D
6	B	36	B	66	A	96	C
7	A	37	A	67	C	97	D
8	B	38	B	68	A	98	C
9	B	39	D	69	D	99	C
10	C	40	A	70	A	100	B
11	C	41	D	71	A	101	B
12	D	42	A	72	D	102	D
13	B	43	A	73	B	103	C
14	A	44	C	74	B	104	A
15	B	45	C	75	A	105	B
16	B	46	A	76	A	106	A
17	D	47	D	77	B	107	A
18	A	48	D	78	A	108	D
19	C	49	C	79	B	109	B
20	C	50	B	80	C	110	A
21	B	51	C	81	B	111	A
22	C	52	D	82	A	112	C
23	B	53	A	83	D	113	A
24	D	54	D	84	A	114	C
25	D	55	D	85	C	115	B
26	C	56	B	86	C	116	B
27	D	57	B	87	C	117	B
28	B	58	A	88	D	118	A
29	B	59	D	89	B	119	D
30	B	60	D	90	C	120	B



**UNIT-VII****CHAPTER-7 EVOLUTION****IMPORTANT POINTS**

The origin of life on earth can be understood only against the background origin of universe especially earth. Most scientists believe chemical evolution, i.e., formation of biomolecules preceded the appearance of the first cellular forms of life. The subsequent events as to what happened to the first form of life is a conjectured story based on Darwinian ideas of organic evolution by natural selection. Diversity of life forms on earth has been changing over millions of years. It is generally believed that variations in a population result in variable fitness. Other phenomena like habitat fragmentation and genetic drift may accelerate these variations leading to appearance of new species and hence evolution. Homology is accounted for by the idea of branching descent. Study of comparative anatomy, fossils and comparative biochemistry provides evidence for evolution. Among the stories of evolution of individual species, the story of evolution of modern man is most interesting and appears to parallel evolution of human brain and language.

- 1 Alternative forms of a gene are called \_\_\_\_\_.  
a) loci                      b) multiples                      c) Chromosomes                      d) Alleles
- 2 Heredity or inheritance of specific traits became clearer due to  
a) Lamarck's theory      b) Mendel worked on garden peas  
c) Darwinism              d) Neo-Darwinism
- 3 Which of the following sentences is true about the evolutionary process?  
a) There is no real 'progress' in the idea of evolution.  
b) humans are unique, a totally new type of organism.  
c) progress is nature's religion.  
d) Evolution of life forms was rapid in the beginning ages.
- 4 Microevolution takes place due to  
a) somatogenic variation  
b) blastogenic variation  
c) continuous variation  
d) Successive variation
- 5 The difference between Homo sapiens and the Homo erectus was \_\_\_\_\_.  
a) Homo sapiens originated in Africa while Homo erectus was in Asia  
b) Homo erectus were much smaller in size than homo sapiens.  
c) Homo erectus stayed in Africa while Homo sapiens did not.  
d) The size of their brain of Homo eructus was smaller to homo sapiens

- 6 By studying analogous structures we look for \_\_\_\_\_.  
 a) similarities in appearance and function but different in structure.  
 b) similarities in appearance but differences in functions.  
 c) Similarities in organ structure.  
 d) Similarities in cell make up.
- 7 \_\_\_\_\_ was a predecessor of Darwin and he developed the theory of acquired characteristics.  
 a) Weismann            b) Mendel            c) Malthus            d) Lamarck
- 8 Which of these is not a living fossil?  
 a) Archaeopteryx    b) Duck-billed platypus    c) Lungfish    d) Frog
- 9 Which of the following are not the examples of analogous structures?  
 a) Wings of bat and butterfly.  
 b) Wings of bat and forelimb of cattle.  
 c) Thorn and spine.  
 d) Tendril of Lathyrus and tendril of Gloriosa.
- 10 The scientist who cut off the tails of mice of successive generations to prove Lamarck's theory was wrong was \_\_\_\_\_.  
 a) Weismann            b) Haeckel            c) Darwin            d) Wallace
- 11 Human being belongs to the species of \_\_\_\_\_.  
 a) Homo erectus  
 b) Homo habilis  
 c) Homo sapiens  
 d) Hominidae
- 12 Links between organisms that show branching pattern of evolutionary relationships are shown by \_\_\_\_\_.  
 a) living fossils  
 b) comparative embryology  
 c) phylogenetic trees  
 d) two fossil layers
- 13 Speciation is the evolutionary process by which \_\_\_\_\_.  
 a) a new gene pool is formed  
 b) evolutionary paths of species converge  
 c) hybrid species formed  
 d) Shows up differences in physical traits
- 14 Evidences of evolutionary relationships is found in \_\_\_\_\_.  
 a) atmosphere  
 b) fossils  
 c) ocean beds  
 d) rocks

15. Which of the following is not a source of variation in a population?
  - A. Inherited genetic differences.
  - B. Differences due to health.
  - C. Differences due to age.
  - D. None of the above.
16. Which of the following examples of variation is not important from an evolutionary standpoint?
  - A. Genetic differences between individual organisms comprising the population.
  - B. Inherited differences between individual organisms comprising the population.
  - C. Differences due to diet, health, age or accident that have no affect on an individual's ability to survive and reproduce.
  - D. A and B.
17. Why is genetic variation important from an evolutionary standpoint?
  - A. If all organisms were the same, the entire population would be vulnerable to particular pathogens, like viruses.
  - B. All evolutionary adaptations (e.g. the origin of forelimbs) are the result of the gradual build up of genetic differences between organisms over geologic time.
  - C. Evolution (at the population level) refers to changes in the frequencies of genes in the population over time.
  - D. All of the above.
18. Which of the following is an example of genetic variation?
  - A. Two children have different eye colors.
  - B. One person is older than another.
  - C. One person has a scar, but her friend does not.
  - D. Tod eats meat, but his brother Rod is a vegetarian.
19. Which of the following is an example of environmental variation?
  - A. Apu is a tongue roller, but his brother Sanjay is not.
  - B. Marge dyes her hair blue.
  - C. Homer inherited baldness from his father's side of the family.
  - D. Patti and Selma have hanging ear lobes.
20. What's the difference between natural selection and sexual selection?
  - A. Sexual selection occurs during sex.
  - B. Natural selection is a type of sexual selection.
  - C. Sexual selection is a type of natural selection.
  - D. Sexual selection occurs within demes, natural selection does not.
21. What's the difference between genetic drift and change due to natural selection?
  - A. Genetic drift does not require the presence of variation.
  - B. Genetic drift does not involve competition between members of a species.
  - C. Genetic drift never occurs in nature, natural selection does.
  - D. There is no difference.

22. According to our reading, how did George Cuvier account for extinctions in nature?
- A. Extinctions never occur--there are unexplored parts of the globe where organisms that appear to have gone extinct may still live.
  - B. Extinctions occur when the slow adaptation of organisms over time to their environment is not quick enough to help them respond to changing conditions.
  - C. Extinctions occur at random, they do not reflect God's will.
  - D. Extinctions are due to catastrophic events.
23. Why, according to our reading, did Darwin take so long to publish the Origin of Species?
- A. Darwin wanted to share his theory as quickly as possible once he returned from his voyage on the Beagle.
  - B. It took twenty years for Darwin to develop a theory.
  - C. Darwin suffered from a number of illnesses.
  - D. Darwin was concerned about the reaction of others to the implications of his theory.
24. In which of the following ways is natural selection not analogous to artificial selection?
- A. With natural selection "picking" is due to the fit of an organism with its environment; whereas in artificial selection, the breeder "picks" which organisms will breed.
  - B. Natural selection depends upon the presence of variation, artificial selection does not.
  - C. Natural selection occurs within populations, artificial selection does not.
  - D. There is a limit to how much change can be brought about by natural selection, no such limit exists for artificial selection.
25. Why is the advent of reproductive isolation important from an evolutionary standpoint?
- A. When the organisms comprising two populations of a species can no longer interbreed, the flow of genetic material between them stops.
  - B. It is not important from an evolutionary standpoint. The question is based on a false assumption.
  - C. Reproductive isolation increases the mutation rate.
  - D. Reproductive isolation may slow reproduction.
26. If the theory of natural selection is the survival of the fittest, and the fittest are identified as those who survive, why isn't it regarded as a tautology (a statement that is true only because of the meaning of the terms) ?
- A. The effect of traits on the fitness of an organism can be assessed independently of whether the organism indeed survives .
  - B. It is regarded as a tautology - the question is based on a false assumption.
  - C. There may be some statements in science that are useful even if they are not falsifiable or refutable in principle.
  - D. A and C.
27. The variation natural selection operates on is due to random mutations. What does this imply about natural selection?
- A. Natural selection is also a random process.
  - B. Natural selection is nevertheless a directed process- the likelihood one variant will be favored in a given environment over another is predictable, even if the origin is not.



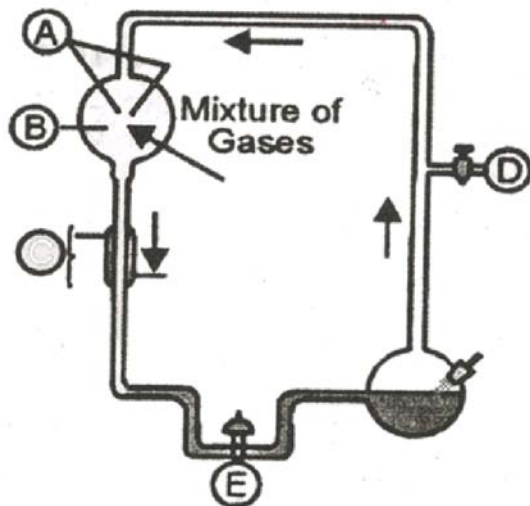
- C. There is no possibility God could be involved in this process.  
 D. A, B and C.
28. How was Mendel's work ultimately reconciled with Darwin's theory of natural selection during the evolutionary synthesis in the 1930s and 1940s?
- A. Scientists recognized that once one thinks about species as populations, rather than individuals, there is no incompatibility between them.  
 B. Mendel's theory was replaced by the mutation theory.  
 C. It was recognized much of the variation we observe in nature is due to recombination, rather than mutation.  
 D. A and C.
29. Which of the following is the evidence for Darwin's theory of common descent?
- A. There are patterns in the fossil record that suggest other species have diverged from a single ancestor species.  
 B. There are biogeographic patterns in the distribution of species, for instance distinct bird species on an island tend to resemble one another, suggesting a common ancestor.  
 C. There are common stages in the early embryological development of organisms representing several distinct vertebrate groups.  
 D. All of above
30. What is the relationship between the wing of a bird and the wing of a bat?
- A. They are homologous because they represent modified forms of a trait present in a common ancestor (forelimbs).  
 B. They are analogous because while each carries out the same function (flight), this trait has arisen independently as a result of convergence (i.e. the common ancestor of both did not have a forelimb that allowed it to fly).  
 C. A and B.  
 D. They represent derived homologies.
31. Which of the following is not an example of a macro evolutionary process?
- A. One lion species splits to form two lion species over geological time.  
 B. The same trait evolves independently in two different taxa (e.g. wings in birds and in insects).  
 C. As a result of their activities, humans drive Dodos (a bird species) extinct.  
 D. Over a short period of time, the frequency of a single gene declines from 10 to 8%.
32. Which of the following is an example of an ancestral homology?
- A. Almost all modern reptiles, birds and mammals have forelimbs, a trait they also share with contemporary amphibians.  
 B. The first birds and all their descendant species have feathers, a trait that is unknown in any other group.  
 C. Humans and many insect species have eyes.  
 D. All of the above.  
 E. None of the above.

33. Which of the following is not an example of micro evolutionary change?
- A. The dark form of many moth species has increased in areas darkened by pollution.
  - B. Penicillin resistant forms of bacteria have arisen since the introduction of antibiotics.
  - C. The proportion of left and right bending moths in cichlid fish remains roughly 50:50.
  - D. The last American eagle dies off, leading to the extinction of the species.
34. Which of the following are difficult to explain in terms of natural selection?
- A. Male peacocks evolve tail feathers that would appear to make them more rather than less vulnerable to predators.
  - B. Male deer evolve antlers that are not used to defend themselves against predators.
  - C. A bird issues a warning cry that puts it at greater risk of being noticed by a predator.
  - D. Some traits appear to have no adaptive value.
35. Which of the following is not an example of a monophyletic taxon?
- A. The first fish species and every living organism that looks like a fish .
  - B. The first mammal species and all its descendants.
  - C. The first bird species and all its descendants.
  - D. All of the above.
36. Which of the following are kingdoms?
- A. Monera .
  - B. Protista.
  - C. Animalae.
  - D. All of the above.
37. Which of the following must increase over geological time according to evolutionary biologists?
- A. Size .
  - B. Complexity .
  - C. Speed of evolutionary processes such as mutation.
  - D. All of the above.
38. Why is similarity misleading when it comes to inferring evolutionary relationships?
- A. Organisms that look alike may be very distantly related to one another.
  - B. Similarities between two species may be due to common descent, without indicating how closely the two are related to one another.
  - C. A and B only.
  - D. The presence of a shared derived character state is often misleading when it comes to inferring relationships between species .
39. Which of the following are the most distantly related to one another?
- A. Sunfish and dolphins.
  - B. Tree frogs and snakes.
  - C. Vampire bats and birds.
  - D. Bears and whales.

40. How does an evolutionary biologist explain why a species of birds has evolved a larger beak size?
- A. Large beak size occurred as a result of mutation in each member of the population.
  - B. The ancestors of this bird species encountered a tree with larger than average sized seeds. They needed to develop larger beaks in order to eat the larger seeds, and over time, they adapted to meet this need.
  - C. Some members of the ancestral population had larger beaks than others. If larger beak size was advantageous, they would be more likely to survive and reproduce. As such, large beaked birds increased in frequency relative to small beaked birds.
  - D. The ancestors of this bird species encountered a tree with larger than average sized seeds. They discovered that by stretching their beaks, the beaks would get longer, and this increase was passed on to their offspring. Over time, the bird beaks became larger.
41. How might an evolutionary biologist explain why a species of species of salamander becomes blind after colonizing a cave?
- A. It is possible that in the cave there is a source of pollution that increases the mutation rate for a gene that makes salamanders blind. Over time, due to exposure to this chemical, the members of the population lose their sight.
  - B. Members of the ancestral population that colonized the cave differed in their ability to see. If maintaining the ability to see in the cave was a waste of energy, blind salamanders might actually have more offspring than those who could see.
  - C. There is no way to explain this in terms of natural selection
  - D. The members of this salamander species no longer needed to use their eyes. Over time, due to lack of use, they lost the ability to see.
42. Which of the following is the most fit in an evolutionary sense?
- A. A lion who is successful at capturing prey but has no cubs.
  - B. A lion who has many cubs, eight of which live to adulthood.
  - C. A lion who overcomes a disease and lives to have three cubs.
  - D. A lion who cares for his cubs, two of who live to adulthood.
43. How is extinction represented in a tree diagram?
- A. A branch splits.
  - B. A branch ends.
  - C. A branch shifts along the X axis.
44. A biologist is trying to infer how five closely related species of snakes are related to one another. She notices that some of the snakes have forked tongues and others do not. Which of the following would help her distinguish the ancestral state?
- A. She looks among snake fossils for evidence that being forked is a characteristic of the ancestor of this group, but determines no such fossils exist.
  - B. She locates a specimen of a more distantly related snake to see if it has a forked tongue.
  - C. She looks at a representative mammal species to see if it has a forked tongue.
  - D. She flips a coin.

- D. A branch shifts along the Y axis.
45. The surface temperature of the sun is \_\_\_\_\_.  
 (A) 6000° C      (B) 9000° C      (C) 1000° C      (D) 10,000° C
46. The earth like other planets formed from \_\_\_\_\_.  
 (A) aggregates of uranium      (B) cloud of gas and dust  
 (C) division of pre-existing planets      (D) collisions of meteorites
47. The experiment to show the production of mice in 21 days from a dirty shirt placed in contact with kernels of wheat was carried out by \_\_\_\_\_.  
 (A) Francesco Redi      (B) Jean Baptiste Van Helmont  
 (C) Aristotle      (D) Louis Pasteur
48. The first formed organism (riboorganism) used only ..... for catalyzing reactions.  
 (A) DNA      (B) amino acids      (C) fatty acids      (D) RNA
49. Anaerobic photosynthetic bacteria appeared on the earth about \_\_\_\_\_.  
 (A) 500 million years ago      (B) 1500 million years ago  
 (C) 2500 million years ago      (D) 3500 million years ago
50. The sequence of origin of life may be considered as \_\_\_\_\_.  
 (A) Amino acid → Protein → Chlorophyll  
 (B) Chlorophyll → Starch → Glycogen  
 (C) Nucleic acid → Amino acid → Chlorophyll  
 (D) Chlorophyll → Nucleic acid → Amino acid
51. The primitive cell-like colloidal particles capable of growth and division were \_\_\_\_\_.  
 (A) prokaryotes      (B) coacervates      (C) eobionts      (D) chemoautotrophs
52. The stage for the evolution of autotrophs was set with the evolution of \_\_\_\_\_.  
 (A) RNA      (B) DNA      (C) ozone      (D) chlorophyll
53. The first organism to be found on a bare rock is a (an) \_\_\_\_\_.  
 (A) moss      (B) alga      (C) lichen      (D) fern
54. The doctrine of evolution is concerned with \_\_\_\_\_.  
 (A) gradual changes      (B) abiogenesis      (C) biogenesis      (D) none of the above
55. The era called 'age of prokaryotic microbes' is \_\_\_\_\_.  
 (A) archaean      (B) precambrian      (C) phanerozoic      (D) proterozoic
56. To determine which molecules might have formed spontaneously on early earth, Stanley Miller used an apparatus with an atmosphere containing \_\_\_\_\_.  
 (A) oxygen, hydrogen and nitrogen  
 (B) oxygen, hydrogen, ammonia and water vapour  
 (C) oxygen, hydrogen and methane  
 (D) hydrogen, ammonia, methane and water vapour
57. The utilization of elements and compounds in nature generation theory because \_\_\_\_\_.  
 (A) life cycles      (B) cyclic pathway      (C) material cycles      (D) recycling

58. What is ethnobotany ?  
 (A) Relationship between primitive plants and people  
 (B) Study to soil  
 (C) Cultivation of flower yielding plants  
 (D) Use of plants and their parts
59. The first photoautotroph organisms were \_\_\_\_\_.  
 (A) bryophytes                      (B) algae  
 (C) cyanobacteria               (D) bacteria
60. Who performed this famous experiment to prove origin of life ?  
 (A) Oparin and Haldane    (B) Spallanzani and Pasteur  
 (C) Urey and Miller         (D) Fox and Pasteur
61. How much temperature was used for the gases to react ?  
 (A) 10° C                   (B) 130° C           (C) 1000° C       (D) 50°C
62. What was the mixture of gases used in chamber marked A ?



- (A) Methane (CH<sub>4</sub>), ammonia (NH<sub>3</sub>), hydrogen (H<sub>2</sub>), and water (H<sub>2</sub>O)  
 (B) Oxygen (O<sub>2</sub>), ammonia (NH<sub>3</sub>), hydrogen (H<sub>2</sub>), and water (H<sub>2</sub>O)  
 (C) Oxygen (O<sub>2</sub>), ozone (O<sub>3</sub>), hydrogen (H<sub>2</sub>), and water (H<sub>2</sub>O)  
 (D) all above
63. What was the resultant found in place marked E ?  
 (A) Glucose, fatty acids and lipids  
 (B) Some fatty acids and organic acids  
 (C) Some amino acids as glycine and alanine and  
 (D) Organic esters only

64. Match the appropriate :

Column – I	Column – II
A. Cosmozoan theory	(i) Oxidizing environment rich in autotrophs like cyanobacteria
B. Spontaneous generation	(ii) Microspheres
C. Primary abiogenesis	(iii) Hot ball of gases
D. Atmosphere I	(iv) Oparin and Haldane
E. Atmosphere III	(v) Panspermia
F. Sydney Fox	(vi) Abiogenesis

	A	B	C	D	E	F		A	B	C	D	E	F
(A)	(v)	(vi)	(iv)	(iii)	(i)	(ii)	(B)	(i)	(ii)	(iii)	(iv)	(v)	(vi)
(C)	(ii)	(iii)	(i)	(v)	(vi)	(iv)	(D)	(vi)	(iv)	(iii)	(v)	(ii)	(i)

65. A. The first molecules formed for replicating cells were most probably RNA.

R. This was proved by origin of ribozyme in 1987 by T. Cech in Tetrahymena.

- (A) If A and R both are true and R is correct explanation of A
- (B) If A and R both are true but R is not correct explanation of A
- (C) If A is true and R is wrong
- (D) If A is wrong and R is true

66. Pick up the correct match

- |                       |                                  |
|-----------------------|----------------------------------|
| I. Core of the earth  | A. Archaeozoic era               |
| II. Life originated   | B. Fe-Ni                         |
| III. Stromatolites    | C. Inter-micromolecular assembly |
| IV. TMC is an example | D. Photosynthesizing algae       |

- |                                    |                                    |
|------------------------------------|------------------------------------|
| (A) I – B, II – A, III – D, IV – C | (B) I – A, II – B, III – C, IV – D |
| (C) I – B, II – D, III – C, IV – A | (D) I – A, II – B, III – D, IV – C |

67. A. Arrhenius considered the panspermia mainly responsible for transfer for germs from other planets to Earth.

R. Present day study of meteorities as Allan Hills-84001 knocked out from Mars in Antarctica is rich aromatic hydrocarbons deposited by biological activity.

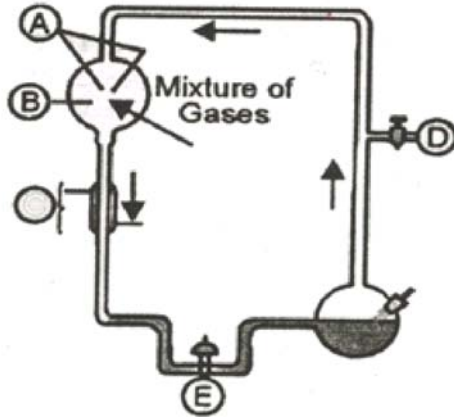
- (A) If A and R both are true and R is correct explanation of A
- (B) If A and R both are true but R is not correct explanation of A
- (C) If A is true and R is wrong
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68. A. The first molecules formed for replicating cells were most probably RNA.

R. This was proved by origin of ribozyme in 1987 by T. Cech in Tetrahymena.

- (A) If A and R both are true and R is correct explanation of A
- (B) If A and R both are true but R is not correct explanation of A
- (C) If A is true and R is wrong
- (D) If A is wrong and R is true

69. Coacervates are  
 (A) colloidal droplets (B) contain nucleoprotein (C) (A) and (B) (D) protobiont
70. The diagram represents Miller experiment. Choose the correct combination of labelling.



- (A) A – electrodes, B –  $\text{NH}_3 + \text{H}_2 + \text{H}_2\text{O} + \text{CH}_4$ , C – cold water, D – Vacuum, E – U trap  
 (B) A – electrodes, B –  $\text{NH}_4 + \text{H}_2 + \text{CO}_2 + \text{CH}_3$ , C – hot water, D – Vacuum, E – U trap  
 (C) A – electrodes, B –  $\text{NH}_3 + \text{H}_2\text{O}$ , C – hot water, D – tap, E – U trap  
 (D) A – electrodes, B –  $\text{NH}_3 + \text{H}_2 + \text{H}_2\text{O} + \text{CH}_4$ , C – steam, D – Vacuum, E – U trap
71. The earliest organisms were \_\_\_\_\_.  
 (A) heterotrophic and anaerobic (B) autotrophic and anaerobic  
 (C) heterotrophic and aerobic (D) autotrophic and aerobic
72. Which one of the following is present today but was absent about 3.5 billion years ago ?  
 (A) Oxygen (B) Nitrogen (C) Hydrogen (D) Methane
73. Coacervates were experimentally produced by .....  
 (A) Sydney Fox and Oparin (B) Fischer and Huxley  
 (C) Jacob and Monod (D) Urey and Miller
74. Urey and Miller in their experiment used a mixture of gases corresponding to primitive earth. These were \_\_\_\_\_.  
 (A)  $\text{C}_3$ ,  $\text{NH}_3$ ,  $\text{H}_2$ ,  $\text{CO}_2$  (B)  $\text{O}_2$ ,  $\text{NH}_3$ ,  $\text{CH}_4$ ,  $\text{H}_2$   
 (C)  $\text{NH}_3$ ,  $\text{CH}_4$ ,  $\text{H}_2\text{O}$ ,  $\text{CO}_2$  (D)  $\text{CH}_4$ ,  $\text{NH}_3$ ,  $\text{H}_2$ ,  $\text{H}_2\text{O}$
75. According to abiogenesis life originate from \_\_\_\_\_.  
 (A) non-living matter (B) pre-existing life  
 (C) chemicals (D) extra-terrestrial matter
76. Mega – evolution is \_\_\_\_\_.  
 (A) Changes in the gene pool  
 (B) evolution due to mutations  
 (C) origin of a new biological group  
 (D) the evolution that takes centuries

77. Evolutionary convergence is characterised by  
 (A) development of dissimilar characteristics in closely related groups  
 (B) development of a common set of characteristics in the groups of different ancestry  
 (C) development of characteristics by random mating  
 (D) replacement of common characteristics in different groups.
78. Parallelism is \_\_\_\_\_.  
 (A) adaptive divergence  
 (B) adaptive convergence  
 (C) adaptive convergence of far off species  
 (D) adaptive convergence of closely related groups.
79. Mesozoic era is associated with mass extinction of \_\_\_\_\_.  
 (A) flowering plants (B) trilobites (C) Dodo (D) dinosaurs
80. Serial homology is exhibited by \_\_\_\_\_.  
 (A) Organs of same individual occupying different levels of the body  
 (B) Organs of different organisms with same function  
 (C) appendages of various parts of prawn body  
 (D) both (A) and (C)
81. Vermiform appendix in man, nictitating membrane and wisdom teeth are \_\_\_\_\_.  
 (A) homologous organs (B) analogous organs  
 (C) vestigial organs (D) none of the above
82. Which one of the following terms would most correctly describe the relationship between the flight organs of animals like locust, bat, swallow, and flying fish ?  
 (A) Atavism (B) Analogous (C) Homologous (D) Vestigial
83. Appearance of facial hair in some people is an example of  
 (A) mongolism (B) analogous organs (C) atavism (D) all above
84. A living connecting link which provides evidence for organic evolution is \_\_\_\_\_.  
 (A) Archeopteryx between reptiles and mammals  
 (B) lung fish between pisces and reptiles  
 (C) duck billed platypus between reptiles and mammals  
 (D) Sphenodon between reptiles and birds
85. Von baer supports the theory of evolution on the basis of  
 (A) embryological character (B) germs layers  
 (C) somatic variations (D) genetic variations
86. Which of the following bird will be called most successfully evolved ?  
 (A) Lays 2 eggs, 2 hatch and 2 reproduce  
 (B) Lays 9 eggs, 9 hatch and 3 reproduce  
 (C) Lays 5 eggs, 5 hatch and 5 reproduce  
 (D) Lays 10 eggs, 5 hatch and 4 reproduce



87. Biogenetic law states that \_\_\_\_\_.  
 (A) ontogeny repeats phylogeny (B) phylogeny repeats ontogeny  
 (C) no two living organisms are alike (D) the favourable acquired characters are inherited
88. A study of evolution has established the systematic positions in many animals. In some animals chordate characters are absent in adult stage, but present in larval stage, eg. Herdmania has been included in \_\_\_\_\_.  
 (A) crustacea (B) protochordata (C) dermaptera (D) onychophora
89. Many of the animals and plants found on islands are \_\_\_\_\_.  
 (A) endemic (B) exotic (C) sympatric (D) none of these
90. The Haeckel's theory of biogenetic Law means that \_\_\_\_\_.  
 (A) all organisms start as an egg  
 (B) life history of an organism reflects its evolutionary history  
 (C) nonliving matter from life  
 (D) progeny resembles parents
91. The best way of dating fossils recent origin is by \_\_\_\_\_.  
 (A) radio carbon method (B) uranium lead method  
 (C) potassium argon method (D) a combination of all these
92. The age of rock is calculated on the basis of \_\_\_\_\_.  
 (A) types of fossils present (B) number of strata present  
 (C) amount of uranium present (D) none above
93. It is not a true fossil.  
 (A) Placoderm (B) Limulus (C) Archeopteryx (D) Therapsid
94. all mammals, whale, dolphin, bat, monkey and horse have some common trait, but they also show conspicuous differences. This is due to the phenomenon of  
 (A) normalisation (B) genetic drift (C) convergence (D) divergence
95. These are some examples of vestigial structures in man  
 (A) wisdom tooth vermiform appendix, hair  
 (B) wisdom tooth, vermiform appendix, coccyx  
 (C) wisdom tooth, head, nails  
 (D) none of these
96. Precipitation test gives evidence from \_\_\_\_\_.  
 (A) comparative embryology (B) comparative anatomy  
 (C) comparative serology (D) none above
97. In external appearance the krait and lycodon are indistinguishable. This is an example of  
 (A) analogy (B) imitation (C) mimicry (D) homology
98. Postanal tail can be traced in \_\_\_\_\_.  
 (A) cobra (B) earthworm (C) scorpion (D) centipede

99. The Jurassic period belongs to the ..... era.  
 (A) proterozoic (B) archezoic  
 (C) mesozoic (D) cenozoic
100. Which of the following cannot determine phylogenetic relationships ?  
 (A) Physiology (B) Morphology  
 (C) Biogeography (D) Embryology
101. Mark the correct set.
- | <b>Column I</b>                              | <b>Column II</b>                   |
|--|------------------------------------|
| I. Slow evolution                            | A. Non-progressive                 |
| II. Environment is responsible for evolution | B. Aristotle                       |
| III. Homologous                              | C. Bird wing and butterfly wing    |
| IV. Analogous organ                          | D. Wing of bird and hose limb      |
| (A) I – A, II – B, III – D, IV – C           | (B) I – B, II – A, III – D, IV – C |
| (C) I – B, II – A, III – C, IV – D           | (D) I – B, II – C, III – D, IV – A |
102. A. Ear muscles of external ear in man are poorly developed  
 R. These muscles are useful which move external ear freely to detect sound efficiently.  
 (A) If A and R both are true and R is correct explanation of A  
 (B) If A and R both are true but R is not correct explanation of A  
 (C) If A is true and R is wrong  
 (D) If A is wrong and R is true
103. Mesozoic era is called golden period of \_\_\_\_\_.  
 (A) birds (B) amphibians (C) reptiles (D) pisces
104. Which of the following leads to evolution ?  
 (A) Separation of species leading to evolution  
 (B) Differentiation of species  
 (C) Loss of few advanced characters  
 (D) Differentiation and adaption of species as unique entities
105. Evolution and natural selection is demonstrated by  
 (A) DDT resistance in mosquito  
 (B) sickel cell anaemia in pygmies  
 (C) industral melanism  
 (D) all above
106. An important evidence in favour of organic evolution is the occurence of  
 (A) homologous and analogous organs  
 (B) homologous and vestigial organs  
 (C) analogous and vestigial organs  
 (D) homologous organs only

107. Potato and sweet potato \_\_\_\_\_.  
 (A) have edible parts which are homologous organs  
 (B) have edible part which are analogous organs  
 (C) have been introduced in India from the same place  
 (D) None of the above
108. Which one is not a vestigial organ in man ?  
 (A) Wisdom teeth (B) Muscles of external ear-pinna  
 (C) Fossa ovalis (D) Ileum
109. The tracking of evolutionary history of organisms is \_\_\_\_\_.  
 (A) ontogeny (B) phylogeny (C) analogy (D) homology
110. An old view about evolution states that the organisms were created by a super organism in the same condition as they exist now. This theory is called \_\_\_\_\_.  
 (A) theory of special creation (B) theory of natural selection  
 (C) Lamarck's theory of evolution (D) theory of spontaneous generation
111. Who gave evolutionary concept of determinants ?  
 (A) Dobzhansky (B) Wright (C) Weismann (D) Lamarck
112. Darwin's theory of natural selection is objected, because it  
 (A) stresses upon slow and small variations  
 (B) explains the adaption of certain inherited characters  
 (C) stresses on interspecific competition  
 (D) explains that natural calamities take a heavy annual toll of lives
113. Given : 1 = natural selection ; 2 = variations and their inheritance ; 3 = survival of the fittest ; 4 = struggle for existence. According to Darwinism, which of the following represents the correct sequence of events in the origin of new species ?  
 (A) 1, 2, 3, 4 (B) 2, 3, 1, 4  
 (C) 3, 4, 1, 2 (D) 4, 2, 3, 1
114. Theory of Lamarck was based on  
 (A) adaptive collisions (B) adaptive radiations  
 (C) adaptive modifications (D) none of these
115. Darwin's natural selection is based on  
 (A) variations  
 (B) prodigality, struggle for existence, survival of fittest  
 (C) law of use and disuse  
 (D) law of inheritance of acquired characters
116. Industrial melanism is an example of  
 (A) natural selection (B) mutation  
 (C) adaptive convergence (D) artificial selection

117. Which statement is correct ?
- (A) Lamarck theory – Struggle for existence
  - (B) Darwin theory – Use and disuse of organ
  - (C) Biogenetic law – Recapitulation theory
  - (D) Lamarck theory – Theory of continuity of germplasm
118. Match the correct set.
- | Column I                              | Column II               |
|---------------------------------------|-------------------------|
| I. Modified form of Lamarckism        | A. G.L. Stebbins (1950) |
| II. Variation and evolution in plants | B. Neo- Lamarckism      |
| III. Germinal selection theory        | C. Etienne Geoffroy     |
| IV. Supporter of Lamarck’s theory     | D. August Welsmann      |
- (A) I – A, II – B, III – C, IV – D
  - (B) I – D, II – B, III – C, IV – A
  - (C) I – A, II – B, III – D, IV – C
  - (D) I – D, II – A, III – C, IV – B
119. A. Mutations occurring in the germinal cells of the gonads are called germs mutations.  
R. They are heritable raw materials for natural selection lead to origin of new species.
- (A) If A and R both are true and R is correct explanation of A
  - (B) If A and R both are true but R is not correct explanation of A
  - (C) If A is true and R is wrong
  - (D) If A is wrong and R is true
120. A. All the finches on the Galapagos Islands descended from common ancestor.  
R. They show variations only in their beaks as they got adapted to different feeding habits.
- (A) If A and R both are true and R is correct explanation of A
  - (B) If A and R both are true but R is not correct explanation of A
  - (C) If A is true and R is wrong
  - (D) If A is wrong and R is true
121. Cosmozoic theory was given by \_\_\_\_\_.
- (A) Darwin    (B) Richter    (C) Aristotle    (D) Von Baer
122. Which one of the following phenomena supports Darwin’s concept of natural selection in organic evolution ?
- (A) Development of transgenic animals
  - (B) Production of ‘Dolly’ the sheep by clothing
  - (C) Prevalence of pesticide resistant insects
  - (D) Development of organs from ‘stem cells’ for organ transplantation
123. Retrogressive evolution is shown by \_\_\_\_\_.
- (A) man            (B) birds            (C) tunicates    (D) fish

124. Match the correct set.

Column I

Column II

I. Fossil

A. 345-405 million years ago

II. Devonian period

B. Fossilium

III. Cambrian period

C. 425-500 million years ago

IV. Ordovician period

D. 500-600 million years ago

(A) I – B, II – A, III – D, IV – C

(B) I – A, II – B, III – C, IV – D

(C) I – B, II – C, III – D, IV – A

(D) I – B, II – D, III – C, IV – A

125. A. Genetic drift refers to change in allelic frequencies of a gene pool due to chance and occurs both in large and small populations.

R. Small populations will, therefore, suffer more than larger ones.

(A) If A and R both are true and R is correct explanation of A

(B) If A and R both are true but R is not correct explanation of A

(C) If A is true and R is wrong

(D) If A is wrong and R is true

126. In a population, group of individuals of similar phenotypes are formed due to differential reproduction due to

(A) genetic drift      (B) natural selection

(C) migration      (D) selective hybridization

127. Phylogenetic evolution refers to

(A) genetic relationship and evolutionary sequence

(B) similar habitat

(C) natural affinity of genes

(D) similar character

128. Genetic drift occurs when few individuals of a colonize, the phenomenon is

(A) bottleneck effect (B) assortative mating (C) founder's effect (D) random mating

129. Sympatric speciation arises due to

(A) non-overlapping population of the same area

(B) geographical isolation

(C) overlapping population of the same area

(D) non-reproductive population of the same area

130. Hardy – Weinberg equilibrium is known to be effected by gene flow, genetic drift, mutation, genetic recombination and

(A) evolution

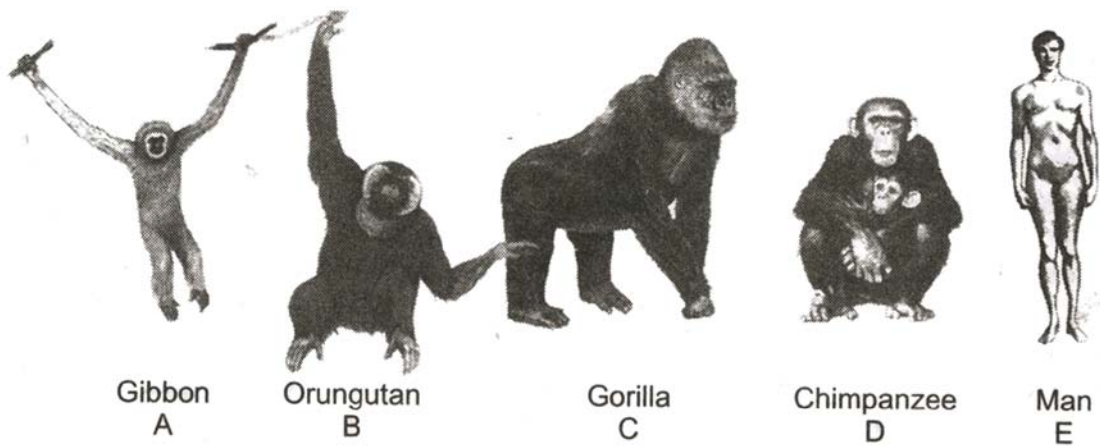
(B) limiting factor

(C) saltation

(D) natural selection

131. Assertion : According to Hardy – Weinberg Equilibrium, the frequency of an allele remains the same generation after genetation.  
Reason : The only way to bring about a change is by natural selection.  
(A) A is correct and R is its explanation.  
(B) A and R both are correct but R is not an explanation to A  
(C) A is correct and R is false  
(D) A is false and R is correct
132. Which is not applicable to the Biological species concept ?  
(A) hybridization (B) natural population  
(C) reproductive isolation (D) gene pool
133. Mass extinction of the end of Mesozoic era was probably due to ?  
(A) continental drift (B) the collision of earth with large meteorites  
(C) massive glaciations (D) change in earth's orbit
134. Apes share ..... blood groups with man  
(A) A, B, AB (B) A, B, O (C) AB, O (D) A and B only
135. Present age of human known as \_\_\_\_\_.  
(A) atomic age (B) iron age (C) bronze age (D) silver age
136. Who was the first civilized man ?  
(A) Cro-magnon man (B) Neanderthal man  
(C) Java ape man (D) Peking man
137. Leakey and Leakey discovered the fossils of \_\_\_\_\_.  
(A) apeman (B) erect man  
(C) Peking man (D) the tool maker
138. The correct sequence of course of cultural evolution from cromagnon to modern man is  
(A) Palaeolithic – Mesoethic – Neolithic – Bronze – Iron – Atomic  
(B) Mesoethic – Bronze – Neolithic – Iron – Atomic  
(C) Palaeolithic – Neolithic – Iron – Bonze – Atomic  
(D) None above
139. Neanderthal man differs from modern man is \_\_\_\_\_.  
(A) receeding jaw (B) protuding jaw  
(C) could make good tools (D) could make good picture
140. 'Piltdown man' is  
(A) Hemo habilis (B) Eoanthropus  
(C) Homo sapiens (D) Pithecanthropine
141. The most recent in human evolution is \_\_\_\_\_.  
(A) mesolithic (B) neolithic  
(C) upper palaeolithic (D) middle palaeolithic

142. Which one of the following statement is correct ?  
 (A) Homo erectus is the ancestor of man  
 (B) Fossils of Cro – magnon has been found in Ethopia  
 (C) Australopithecus is the real ancestor of modern man  
 (D) Neanderthal man is the direct ancestor of Homo sapience
143. The evolution of genera 'Homo' occured in  
 (A) pleistocene (B) pliocene (C) miocene (D) oilgocene
144. Closest primate to man is \_\_\_\_\_.  
 (A) gorilla (B) rhesus monkey (C) orangutan (D) lemur
145. Which is correct according to cranial capacity from the figure given as examples ?



- (A) A = 104 cc, B = 355 cc, C = 500 cc, D = 405 cc, E = 1400 cc  
 (B) A = 355 cc, B = 104 cc, C = 500 cc, D = 405 cc, E = 1400 cc  
 (C) A = 104 cc, B = 355 cc, C = 405 cc, D = 500 cc, E = 1400 cc  
 (D) A = 355 cc, B = 104 cc, C = 405 cc, D = 500 cc, E = 1400 cc
146. Match the correct set

**Column – I**

- A. Old world monkeys  
 B. New world monkeys  
 C. Prosimians  
 D. Simians

A B C D

**Column – II**

1. Tree shrews, the ancestors of primates  
 2. Wide nistrils and prehensile tail  
 3. Narrow nostrils and non prehensile tail  
 4. Monkey and apes

A B C D

- (A) 2 3 1 4  
 (B) 3 2 1 4  
 (C) 2 1 3 4  
 (D) 1 3 2 4

147. Match the features from the columns

**Column – I**

- A. Ape like primate
- B. Ancestor of modern apes
- C. Connecting link between ape and man
- D. First to use fire

**Column – II**

- 1. Homo erectus
- 2. Australopithecus
- 3. Dryopithecus
- 4. Propliopithecus

A B C D

(A) 3 4 2 1

(C) 3 4 1 2

A B C D

(B) 4 3 2 1

(D) 4 2 1 3

148. A. Java man and peking men were called Homo erectus by Mayer.

R. They appeared same as both used fire.

(A) A is correct and R is its explanation.

(B) A and R both are correct but R is not an explanation to A

(C) A is correct and R is false

(D) A is false and R is correct

149. A. From evolutionary point of view, human gestation period is believed to be shortening.

R. One major evolutionary trend in humans has been the larger head undergoing relatively faster growth rate in the foetal stage.

Read the above statement the answer according

(A) If A and R both one correct and R is an explanation to A

(B) If A and R both are correct and R is an explanation to A

(C) If A is correct and R is wrong

(D) If A is wrong and R is correct

150. There are two opposing views about origin of modern man, According to the view Homo erectus in Asia were the ancestors of modern man. A study of variation of DNA however suggested African origin of modern man. What kind of observation on DNA variation could suggest this ?

(A) Greater variation in Africa than in Asia

(B) Variation only in Asia and no variation in Africa

(C) Greater variation in Asia than in Africa

(D) Similar variation in Africa and Asia

151. The first man to use fire was \_\_\_\_\_.

(A) neanderthal man (B) Homo erectus (C) cro-magnon man (D) Australopithecus

152. A human species who were more intelligent than the present human beings

(A) Ramapithecus (B) Australopithecus africanus

(C) Homo erectus (D) Homo fossilis

153. Human evolution actually started in \_\_\_\_\_.

(A) France (B) America (C) Central Asia (D) Africa



154. Peking man is known as \_\_\_\_\_.
- (A) Australopithecus (B) Sinanthropus (C) Pithecanthropus (D) Homo sapiens
155. Which of the following is correct match regarding cranial capacity and location of respective fossil
- (A) Australopithecus – Africa (450 600 CC) (B) Java man – Germany (800 CC)  
(C) Neanderthal – Africa (500–600 CC) (D) Homo sapiens – South east Asia
156. Which one of the following ancestors of man first time showed bipedal movement ?
- (A) Australopithecus (B) Cro-magnon (C) Java apeman (D) Peking man
157. One of the oldest, best preserved and most complete hominid fossil commonly known as ‘Lucy’ belongs to the genus.
- (A) Oreopithecus (B) Dryopithecus (C) Pithecanthropus (D) Australopithecus

**ANSWER KEY**

1 D	2 B	3 A	4 B	5 D	6 A
7 D	8 A	9 B	10 A	11 C	12 C
13 A	14 B	15 D	16 C	17 D	18 A
19 B	20 C	21 B	22 D	23 D	24 A
25 A	26 D	27 B	28 D	29 D	30 C
31 D	32 A	33 D	34 D	35 A	36 D
37 D	38 C	39 A	40 C	41 B	42 B
43 B	44 B	45 A	46 B	47 B	48 D
49 D	50 C	51 C	52 D	53 C	54 C
55 A	56 D	57 C	58 A	59 D	60 C
61 B	62 A	63 C	64 A	65 A	66 A
67 A	68 A	69 C	70 A	71 A	72 A
73 D	74 D	75 A	76 C	77 D	78 D
79 D	80 D	81 C	82 B	83 C	84 C
85 A	86 C	87 A	88 B	89 A	90 B
91 D	92 C	93 B	94 D	95 B	96 C
97 C	98 A	99 C	100 B	101 A	102 C
103 C	104 D	105 D	106 B	107 B	108 D
109 B	110 A	111 B	112 B	113 C	114 B
115 A	116 C	117 C	118 C	119 A	120 B
121 C	122 B	123 A	124 A	125 A	126 A
127 C	128 D	129 D	130 A	131 D	132 A
133 C	134 C	135 D	136 A	137 A	138 A
139 A	140 D	141 D	142 A	143 B	144 A
145 A	146 C	147 B	148 A	149 D	150 C
151 B	152 D	153 D	154 B	155 A	156 A
157 D					



## Unit-VIII

### Chapter-8. Animal Husbandary and plant breeding

- (1) The cow contain 250 kg weight produce how much protei=n per day.  
 (A) 250 gm      (B) 250 kg      (C) 200 gm      (D) 200 kg
- (2) Cattle keepers are in center position in dairy industry because.....  
 (A) They carries good varieties of cattles.  
 (B) They prepare different type of milk products.  
 (C) Their products are sold at national in dairy industry.  
 (D) They have brought white revolution in dairy industry.
- (3) Who was pioneer of dairy industry in Gujarat ?  
 (A) Fahian      (B) Haber      (C) Varges kurian   (D) Venus (whenson)
- (4) Where Imperial Veterinary Research Institute is located ?  
 (A) New delhi      (B) Izatnagar      (C) Channai      (D) Kolkata
- (5) Who is known as the father of modern bee science ?  
 (A) Fahian      (B) Kurian      (C) Whenson      (D) Huber
- (6) Which is improper pair ?  
 (A) Breeding female honey bee - Worker      (B) Non breeding female hoey bee - Worker  
 (C) Breeding male honey bee - Drone      (D) Breeding female honey bee - Queen
- (7) What is carried out in apiary (apiculture) ?  
 (A) Honey bee brings nectar  
 (B) Manufacture of colours, polish, cosmeties from wax  
 (C) The rearing of honey bee colonies  
 (D) All the above
- (8) Edible marine fishes are  
 (A) Hilsa, Pomfret, Catla(B) Catla, Mackerel, Mrigal  
 (C) Sardin, Mackerel, Mrigal   (D) Sardin, Pomfret, Mackerel
- (9) Which type of hybridization is done for mule ?  
 (A) In breeding hybridization   (B) Out breeding hybridization  
 (C) Inter specific hybridization   (D) Intra specific hybridization
- (10) Single cell protein is produced by  
 (A) Anaerobic respiration (fermentation)      (B) Aerobic respiration  
 (C) Biofortication      (D) Paturization

- (11) Which sentence is not proper for the uses of single cell protein ?  
 (A) Use as human or animal protein supplement  
 (B) At's utilization reduces enviornmental pollution  
 (C) Use as a production of human gene  
 (D) At has a high contens of protein, lipid, carbohycrate & vitamins
- (12) Which microorganism produces same quantity of protein per day ?  
 (A) Spirokits helophylls  
 (B) Methenogens  
 (C) *Methylophillus methylotrophs*  
 (D) *Thermo acidophylls*
- (13) Which is corrcet for plant breeding.  
 (A) Collection of variability → selection of recombination → hybridization among parents → testing and commercilization of new cultivation.  
 (B) Collection of variability → selection of parents → hybridization among parents → selection of recombination → testing and commercialization of new cultivation.  
 (C) Selection of recombination → collection of variability → selection and hybridization of parents → testing and commercialization of new cultivation.  
 (D) Selection of parents → hybridization among parents → collection of variability → selection of recombination → testing and commercialization of new cultivation.
- (14) Which substance is twice amount of in maize hybrids.  
 (A) Lysine                      (B) Leusine                      (C) Iso leusine                      (D) Glycine
- (15) Write full form of IVRI ?  
 (A) Internation veterinary research institute.  
 (B) Indian veterinary research institute.  
 (C) Imperial veterinary research institute.  
 (D) Imperial viral research institute.
- (16) Write full form of IARI ?  
 (A) International agricultural research institute.  
 (B) Indian agricultural research institute.  
 (C) Imperial agricultural research institute.  
 (D) Indian aronitical research institute.
- (17) At temperature is carried for the explant in tissue culture?  
 (A) 02.4°c                      (B) 0.24°c                      (C) 024.0°c                      (D) 0240°c
- (18) Callus is obtaind during which time in tissue culture ?  
 (A) 2 to 3 days                      (B) 2 to 3 months                      (C) 2 to 3 weeks                      (D) 2 to 3 hours
- (19) In which method rotary shaker is used ?  
 (A) Embryo culture                      (B) Biofortification                      (C) Suspension culture                      (D) Symbiosis

- (20) Which method can be used for hybrid plantlet of interspecific ?  
 (A) Embryo culture      (B) Tissue culture    (C) Suspension culture    (D) Callus culture
- (21) The hybridization to obtain higher level of protein and minerals is.....  
 (A) Pasturization      (B) Biofortification    (C) Antibiosis              (D) Symbiosis
- (22) Which statement is improper for intraspecific hybridization.  
 (A) Animals of two different species are interbreed.  
 (B) The offspring show characters quite different form those observed in both parents.  
 (C) In some cases fertility of offsprings gradually decreases.  
 (D) Some times, the offsprings may possess all the desirable characters.
- (23) Which genetically engineered technique is used to reduce environmental pollution to solve human nutrition problem.  
 (A) Single cell protein.  
 (B) Biofortification.  
 (C) Bio gas production.  
 (D) Pasturization.
- (24) The plant tissue or organ that produce callus by division is called.....  
 (A) Explant              (B) Sepling              (C) Embryo              (D) Clone
- (25) In which plant the seeds do not contain stored food ?  
 (A) *Atropa beladonna*    (B) *Canbis sataiva*      (C) Orchids    (D) Opium
- (26) Statement A : Thousands of years ago agriculture began  
 Statement B : At the same time animal husbandary, dairy farming, poltry & fisheries developed.  
 Which statement is correct for statement A and reson R.  
 (A) Both A and R are correct R is the correct explanation of A.  
 (B) Both A and R are correct, but R is not correct explanation of A.  
 (C) A is correct and R is wrong.  
 (D) A is wrong and R is correct.
- (27) Which statement is true for the researches carried out at the IVRI.  
 (A) In india little attendance has been paid for developing poultry industry in comparision to other countries.  
 (B) High biological value of eggs is recommended the consumption of eggs.  
 (C) Poultry keeping has become small scale industry for palatable and nutritive food which it provides in the form of eggs as well as adult animals.  
 (D) In India poutry farms development is necessary.
- (28) Which statment is improper for honey ?  
 (1) Used of honey is mentioned in our prehistoric religious literatares.  
 (2) Honey fluid formed form the glands of the stomach of worker honey bee.  
 (3) Male honey bee are responsible for only breeding.

- (4) Honey and bee's wax are used to manufacture of paints, polish etc.  
 (5) It is the product mutually produced by plant and honey bee.  
 (A) (1), (3), (4), (5)      (B) (1), (3)      (C) (1), (3), (5)      (D) (2), (4)
- (29) Which group is for common fresh water fishes.  
 (A) Rohu, mrigal, catia                                      (B) Catla, rohu, mackerel  
 (C) Mrigal, mackerel, pomfrets                              (D) Major carp, hilsa, sardin
- (30) Through plant tissue culture growing the cell, tissue and organ in culture medium is called.....  
 (A) Toti potency  
 (B) Stored food  
 (C) Inter specific hybridization  
 (D) Dormancy
- (31) Match proper pair :

**Colum-1**

**Colum-2**

- |                  |                               |
|------------------|-------------------------------|
| P. Milk          | (i) Tasty and nutritive food. |
| Q. Honey         | (ii) Callus culture.          |
| R. Agar-agar     | (iii) Pasturization.          |
| S. Rotery shaker | (iv) Medicinal vakce.         |
| T. Eggs          | (v) Suspension culture.       |
- (a) (P - i)(Q - iii)(R - ii)(S - iv)(T - v)  
 (b) (P - iii)(Q - iv)(R - v)(S - ii)(T - i)  
 (c) (P - iii)(Q - iv)(R - ii)(S - v)(T - i)  
 (d) (P - i)(Q - ii)(R - iii)(S - iv)(T - v)
- (32) What is proper for outbreeding.  
 (A) Fertility of offsprings gradually decreases.  
 (B) Collection of harmful dominant genes.  
 (C) Animals of two different specier are interbred.  
 (D) A superior male of any one species is mate with a female of other species.
- (33) Match proper option in colum 1 & 2.

**Colum-1**

**Colum-2**

- |                       |  |
|-----------------------|--|
| (P) 1. Santa gertudis | (i) Rapid clon enlarging.              |
| (Q) 2. Orchid         | (ii) Inter specific hybridization.     |
| (R) 3. Habrid maize   | (iii) Reduces enviornmental pollution. |
| (S) 4. Mule           | (iv) Out breeding.                     |
| (T) 5. Methylophills  | (v) Bio fortification.                 |
- (a) (P - ii)(Q - iv)(R - i)(S - iii)(T - v)  
 (b) (P - iv)(Q - i)(R - v)(S - ii)(T - iii)  
 (c) (P - v)(Q - i)(R - ii)(S - iii)(T - iv)  
 (d) (P - i)(Q - ii)(R - iii)(S - iv)(T - v)

- (34) Which process is necessary be for producing new genic variety through plant breeding.
- (A) Selection of recombinants.
  - (B) Testing new cultivation.
  - (C) Selection and evaluation of parents.
  - (D) Testing, release and commercialization of new cultivation.
- (35) Which option is proper for event of callus cultre ?
- (A) Explant → cell division → callus → adding cytokinin → transform from cell to meristmatic tissue.
  - (B) Explant → callus → cell division → adding cytokinin → transform from cell to merismatic tissue.
  - (C) Callus → adding cytokinin → cell division → transform from cell to meristmatic tissue → explant.
  - (D) Cell division → adding cytokinin → callus → explant → transform from cell to meristmatic tissue.
- (36) What is improper in callus and suspension culture ?
- (A) Regeneration of sapling.
  - (B) Formation of cell biomass.
  - (C) Development of genetically modified plants
  - (D) Protoplast isolation
- (37) Which type of plant is produce by plant tissue culture.
- (A) Interspecific.
  - (B) Dormant species.
  - (C) Genetically modified species.
  - (D) Hybrid species.
- (38) The goals of animal breeding are.....
- (A) Extension of reproductive phase of lite.
  - (B) Increase in growth rate.
  - (C) Higher quality for animal products.
  - (D) All above.
- (39) In plant tissue culture due to which process volume of the medium is decrecse...
- (A) To manage the 24°C temperature for the explant.
  - (B) Due to air exchange.
  - (C) Due to evoperation.
  - (D) Rotates over in rotary shaker.
- (40) What is the aim of embryo culture ?
- (A) Sub culturing.
  - (B) Uses of 2,4-D and cytokinin.
  - (C) Protoplast isolation.
  - (D) Growth of plant lets from dormant seeds.

**ANSWER KEY**

1 c	2 a	3 c	4 b	5 d
6 a	7 c	8 d	9 d	10 a
11 c	12 c	13 b	14 a	15 c
16 b	17 c	18 c	19 d	20 a
21 b	22 c	23 a	24 a	25 c
26 c	27 b	28 d	29 a	30 a
31 c	32 d	33 b	34 c	35 a
36 c	37 c	38 d	39 c	40 d





## Unit -VIII

### Chapter-9. Human Health and Diseases (Immunity, Vaccination, Cancer, Aids)

#### IMPORTANT POINTS

Health means absence of disease It also can be defined as "Expression of physical,mental, social and psychological wellbeing".

"Human disease like typhoid, cholera, pneumonia, disease of skin, malaria are included in the preparation of NEET exam". These kind of diseases give stress to human. Malaria caused by plasmodium falciparum may prove lethal for human. Cleanliness proper discharge of waste, water cleanliness, control of mosquito and vaccination are required for controlling these kind of diseases

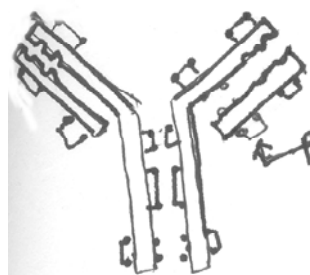
You study here disease causing organisms, Antigen, Antibody, Immunesystem, Vaccination, Aids, Cancer, Malaria, Filariasis, Typhoid, Pneumonia, Common cold, Ringworm, Adolescence and others. In Adolescence the Drug and alcohol abuse is done by youth and adolescent mostly. Drug and alcohol are intoxicant in nature and their perceived benefits like relief from stress, a person may try taking this in face of peer pressure, examination-related and competition-related stresses by doing so, he/she get addicted, To get protected from this effected education about the harmful effects, counselling and seeking immediate professional and medical help would relieve the individual from these completely.

By securing required kind of vaccination to prevent disease, fearless situations may be produced.

The different types questions formed by considering all these point will be very useful to the students for their future.

- Which person is suffering from disease according to given sentences ?
  - Mahesh walks slowly & become tired.
  - There is appearance of scaly lesions on skin of naresh.
  - Paresh is suffering from vomiting.
  - All of them suffer from disease.
- What is the location of Salmonella typhi during diseased condition ?
  - Stomach
  - Kidney
  - Liver
  - Intestine
- Which test is carried out if disease is occurred by salmonella typhi ?
  - Widal test
  - Lisman test
  - Blood test
  - Barium test
- Generally streptococcus pneumoniae causes pneumonia but which bacteria is responsible for this disease ?
  - Pneumococcus
  - Tuberculosis.
  - Haemophilus influenzae
  - Salmonella typhi

5. Chhaganbhai is suffering from fever, then which kind of organism responsible for it ?
  - (a) Plasmodium vivex
  - (b) Plasmodium malarie.
  - (c) Plasmodium falciparum
  - (d) All of hte given.
6. Duration of fever occured by plasmodium malarie is \_\_\_\_\_
  - (a) Every 24 hours.
  - (b) Every 48 hours.
  - (c) Every 36 hours.
  - (d) Every 72 hours.
7. From which kind of host life cycle of plasmodium passes ?
  - (a) Male of Human & of Anopheles mosquito.
  - (b) Male of Human & Male of Anopheles mosquito.
  - (c) Human & Female Anopheles mosquito.
  - (d) Human & Male Anopheles mosquito.
8. What is responsible for malaria...?
  - (a) All Anopheles mosquitoes.
  - (b) All Culex mosquitoes.
  - (c) Only male Anopheles mosquitoes
  - (d) Only female Anopheles mosquitoes
9. The spherical form of metacryptomezoites is called \_\_\_\_\_
  - (a) Sporozoites
  - (b) Cryptoschizont
  - (c) Trophozoite
  - (d) Gamato cyte
10. What is improper for ringworm disease.
  - (a) It is done by Trichophyton fungi.
  - (b) By constant itching the lesions get expanded
  - (c) It is done by using infected persons comb.
  - (d) It is done by secretion of serotonin chemical.
11. In figure what is indicated by "P" ?
  - (a) Hydrogen bond
  - (b) Ionic bond
  - (c) Disuphlide bond
  - (d) Hydrophobic bond
12. Give the name of scientist who are concern with interferon word.
  - (a) Watson & Crick
  - (b) Khorana
  - (c) Luis pasteur & Stemberg
  - (d) Ellic isaks & jan lindenmen
13. At Which time interferon is secreted ?
  - (a) When antibody reacts with antigen in our body.
  - (b) When serotonin become active
  - (c) When lymphocytes become active
  - (d) When our body cell's are infected by virus then that cell's secret this chemical.



14. Which is the process of biological control, which is for controlling to spread the disease caused by mosquitoes.?
- (a) Mosquito net (b) Spreading & chemicals  
(c) Fish like Gambusia (d) Net in doors & windows
15. Give the location of Ig-G ?
- (a) Nucleus (b) Cytoplasm (c) Blood (d) Mitochondria
16. Give the correct sequence from pre erythrocytic cycle ?
- (a) Saliva - Sporozoites-Blood-liver-Cryptoschizont-Cryptomerozoites.  
(b) Sporozoites-Saliva-Blood-Liver-Cryptoschizont-Cryptomerozoites.  
(c) Saliva-Cryptoschizont-Blood-Liver-Sporozoites-Cryptomerozoites.  
(d) Saliva-Sporozoites-Liver-Blood-Cryptoschizont-Cryptomerozoites.
17. Give the correct Sequence for endo erythrocytic cycle ?
- (a) Metacryptomerozoites-Trophozoite-Schizont-in RBC-Gametocyte-Merozoites.  
(b) Metacryptomerozoite-in RBC-Trophozoite-Schizont-Merozoites-Gametocyte  
(c) Metacryptomerozoites-in RBC -Trophozoite-Merozoites-Schizont-Gametocyte  
(d) Cryptomerozoite-in RBC-Trophozoite-Schizont-Merozoites-Gametocyte
18. Which one is odd ?
- (a) Opium poppy -gives pleasant feeling  
(b) Claviceps Purpurea-Hallucinogenic  
(c) Erythrolum Coca-Potent stimulating action  
(d) Cannabis Sativa-give pain
19. Which one is odd ?
- (a) Malaria (b) Pneumonia (c) HIV (d) Typhoid.
20. Which one is odd ?
- (a) Malaria (b) Pneumonia (c) AIDS (d) Typhoid.
21. Which one is odd ?
- (a) Cannabinoids (b) Ganja (c) Charas (d) Smack
22. Which one is odd ?
- (a) Cannabinoids (b) Marijuana (c) Ganja (d) Morphin
23. According to their production which one is odd ?
- (a) Cannabinoids (b) Marijuana (c) Ganja (d) Charas
24. Mark odd one ?
- (a) Cancer of breast (b) Cancer of lung  
(c) Cancer of stomach (d) Cancer of muscle
25. Mark odd one ?
- (a) Cancer of Bone (b) Cancer of cartilage  
(c) Cancer of Blood (d) Cancer of Muscle

26. Mark odd one ?  
 (a) Mucus                      (b) Saliva                                      (c) Tears                                      (d) Acid
27. Mark odd one ?  
 (a) Burning sensation in intestine  
 (b) Burning sensation in Alveoli  
 (c) Headache  
 (d) Increase in size of liver & spleen
28. Mark odd one ?  
 (a) Lips & nail turns to blue or grey in color  
 (b) Burning is felt in alveolar wall  
 (c) Headache  
 (d) Increase in size of liver & spleen
29. Mark odd one ?  
 (a) Chicken gonorrhoea                      (b) Elephantiasis                      (c) Diphtheria                      (d) Malaria
30. Mark odd one ?  
 (a) Retro virus  
 (b) Oncogenic virus  
 (c) Rhino virus  
 (d) Haemophilus influenzae
31. Give the location for storage of erythrocytes  
 (a) Pancreas                      (b) Spleen                      (c) Liver                      (d) Stomach
32. What is called disease according to Oxford english dictionary ?  
 (a) The bad performance of body or body parts with some particular symptom.  
 (b) Body or body's parts that obstructs the functioning of them  
 (c) Any physical or actional change from normal condition  
 (d) Disease spread from one person to another
33. From the following sentences which one is appropriate for pneumonia ?  
 p- Burning is felt in alveolar wall  
 q- There is obstruction of wind pipe  
 r- Pain in inhalation, cough & headache are seen  
 s- Incubation period is of 1 to 3 days.  
 (a) P,Q,R,S all are improper  
 (b) P,Q,R,S proper & S is improper  
 (c) P,Q are proper & R & S are improper  
 (d) P,Q,R,S all are proper
34. Which is the hereditary material in retro virus ?  
 (a) DNA                      (b) RNA                      (c) Lipoprotein                      (d) Vitamin

35. \_\_\_\_\_ is an unclear byproduct of heroine ?  
 (a) Smack (b) Delta-9-THC (c) LSD (d) Cannabinoids
36. Which one is matched with LSD ?  
 (a) Fungi (b) Bacteria (c) Virus (d) Protozon
37. What is formed during Innate immunity ?  
 (a) Body prepare Antibodies against antigen  
 (b) Antibodies are present in body from birth  
 (c) Prepare antibodies are introduced into body.  
 (d) All of the given.
38. In which disease prepared antibodies are entered ?  
 (a) Chicken pox (b) T.B (c) Cold (d) Rabies
39. What is reason for causing AIDS.  
 (a) Cereto immunity (b) Interferon  
 (c) Destroying & Helper Tcells (d) Destroying of killer T cells
40. From what Neoplastic is generated ?  
 (a) X rays (b)  $\gamma$  rays (c) U.V rays (d) DNA
41. From what Lysergic acid is formed ?  
 (a) Ergot fungi (b) Cannabinoids plants (c) Heroine (d) THC
42. Which one is right sequence for lifecycle of Anopheles mosquito ?  
 (a) Oocyst  $\rightarrow$  ookinese  $\rightarrow$  sporozoites  $\rightarrow$  gamatooyte  
 (b) Ookinete  $\rightarrow$  oocyst  $\rightarrow$  gamatocyte  $\rightarrow$  sporozoites  
 (c) Gamatoeyte  $\rightarrow$  oocyst  $\rightarrow$  sporozoites  $\rightarrow$  ookinete  
 (d) Gamatocyte  $\rightarrow$  ookinete  $\rightarrow$  oocyst  $\rightarrow$  sporozoites
43. Genetic material of virus in macrophage is regenerated in DNA by which enyme ?  
 (a) Transcriptase (b) Reverse Transcriptasce  
 (c) RNA polymerase (d) DNA polymeane
44. Which plant is responsible for doing hallucination ?  
 (a) Atropa Baladona (b) Datura (c) Erythroxyllum coca (d) All of the given
45. Because of smoking which kind of changes occurs in blood ?  
 (a) Proportion of CO<sub>2</sub> decreases & in Hb also CO<sub>2</sub> deoreases  
 (b) Propotion of O<sub>2</sub> decreases & in Hb propertion of O<sub>2</sub> increases  
 (c) Proportion of O<sub>2</sub> increases & in Hb proportion of O<sub>2</sub> decreses.  
 (d) Proportion of CO<sub>2</sub> increases & in Hb proportion of O<sub>2</sub> decreses.
46. Suddenly any person get rid of Alcohol or drug then which kind of deficincy occurs in that person?  
 (a) Visual Syndrome (b) Drowns syndrome  
 (c) Turner syndnome (d) Cry-du-chat syndrome



56. W.B test : AIDS - Immuno deficiency syndrome

WIDAL test : \_\_\_\_\_ , \_\_\_\_\_

- (a) Typhoid, increase in size of spleen & liver
- (b) Typhoid, pain in stomach
- (c) Typhoid, Burning in felt in intestine
- (d) All of the given

57. Match the column-I, column-II & column-III.

<b>Column-I</b>	<b>Column-II</b>	<b>Column-III</b>
(P) Ergot fungi	(i) Latex of unripened fruit	(I) Morphine
(Q) Erthroxylyum	(ii) Dry leaves & Inflorescenc of plant	(II) Crack
(R) Cannabis Sativa	(iii) Top of dry flower	(III) LSD
(S) Opium Poppy	(iv) Fruit	(IV) Marijuana
(a) P-(iv)-(III), Q-(ii)-(II), R-(iii)-(IV), S-(i)-(I)		
(b) P-(iii)-(II), Q-(ii)-(I), R-(iv)-(III), S-(i)-(IV)		
(c) P-(ii)-(I), Q-(iii)-(III), R-(i)-(IV), S-(iv)-(II)		
(d) P-(i)-(IV), Q-(iv)-(III), R-(iii)-(II), S-(ii)-(I)		

58. Match the column-I & column-II

<b>Column-I</b>	<b>Column-II</b>
(P) Cold	(i) Rhino Virus
(Q) Pneumonia	(ii) HIV
(R) AIDS	(iii) Salmonella typhi
(S) Typhoid	(iv) Halmophilus Influenza
	(v) Plasmodium Vivex

- (a) P - i, Q - iv, R - v, S - ii
- (b) P - i, Q - iv, R - ii, S - v
- (c) P - i, Q - iv, R - ii, S - iii
- (d) P - i, Q - iii, R - ii, S - iv

59. Match the following

<b>Column-I</b>	<b>Column-II</b>
(P) CMI	(i) Virus of AIDS
(Q) PMNL	(ii) Mucosal Associated Lymphoid Tissue
(R) MALT	(iii) Cell Mediated Immunity
(S) HIV	(iv) Leucocytes
(a) P - iii, Q - iv, R - ii, S - i	
(b) P - ii, Q - iii, R - iv, S - i	
(b) P - iii, Q - ii, R - iv, S - i	
(d) P - ii, Q - iv, R - i, S - iii	

60. Match the column I & II

**Column-I**

- (P) Primary lymphoid organ
- (Q) MALT
- (R) Lobe like organ near the heart
- (S) Organ like bean shape

**Column-II**

- (i) Thymus
- (ii) Spleen
- (iii) Bone Marrow
- (iv) Digestive tract
- (v) It constitutes 50% of lymphoid tissue

- (a) P - iii, Q - v, R - i, S - ii
- (b) P - iii, Q - iv, R - v, S - i
- (c) P - ii, Q - i, R - v, S - iv
- (d) P - v, Q - iv, R - i, S - ii

61. Match the column I & II

**Column-I**

- (P) AIDS reported first
- (Q) Diagnosis test of AIDS
- (R) Group of Retrovirus
- (S) Cancer of lymph gland

**Column-II**

- (i) HIV
- (ii) USA
- (iii) Sarcoma
- (iv) ELISA
- (v) Tamilnadu

- (a) P - v, Q - iv, R - i, S - iii
- (b) P - ii, Q - iv, R - v, S - iii
- (c) P - ii, Q - iv, R - v, S - iii
- (d) P - ii, Q - iv, R - i, S - iii

62. Match the column I & II

**Column-I**

- (P) Cellular Barrier
- (Q) Physiological Barrier
- (R) Physical Barrier
- (S) Cytokine Barrier

**Column-II**

- (i) Tears from eye
- (ii) Epithelial lining in urinogenital tract
- (iii) Certain types of Leucocytes
- (iv) Virus infected cell

- (a) P - ii, Q - iii, R - i, S - iv
- (b) P - iii, Q - i, R - ii, S - iv
- (c) P - i, Q - ii, R - iii, S - iv
- (d) P - iv, Q - i, R - iii, S - ii

63. Which one is correct for X & Y.

X - Ring worm spreads due to use of towel, cloth & combs of the infectious person.

Y - By constant itching the lesion get expanded.

- (a) X & Y both are right & Y is the correct explanation of X.
- (b) X & Y both are right & Y is not correct explanation of X.
- (c) X is wrong & Y is right.
- (d) Y is wrong & X is right.



64. Match the column I & II

**Column-I**

- (P) Malaria
- (Q) Ringworm
- (R) Cold
- (S) AIDS
- (T) Elephantiasis

**Column-II**

- (i) Plasmodium
- (ii) Rhino Virus
- (iii) Retro Virus
- (iv) Filarial worm
- (v) Microspore

- (a) P - i, Q - iii, R - ii, S - iv, T - v
- (b) P - i, Q - iv, R - ii, S - iii, T - v
- (c) P - i, Q - v, R - ii, S - iii, T - iv
- (d) P - ii, Q - v, R - iii, S - iv, T - i

65. Match the column I & II

**Column-I**

- (P) Marijuana
- (Q) LSD
- (R) Barbiturate
- (S) Amphetamine
- (T) Cocaine

**Column-II**

- (i) It's stimulatory
- (ii) Hallucination
- (iii) Fever with shivering
- (iv) Give pleasure
- (v) It dilates pupil

- (a) P - v, Q - ii, R - iv, S - i, T - iii
- (b) P - v, Q - ii, R - iv, S - i, T - vi
- (c) P - v, Q - iv, R - i, S - iv, T - vi
- (d) P - v, Q - iv, R - i, S - iii, T - vi

66. A - Uncontrolled cell division means cancer

R - Cancer is caused by rays of U.V.

- (a) A & R are Right & R is not correct explanation of A
- (b) A & R both are Right & R is the reason of A
- (c) A is Right & R is Wrong
- (d) A & R both are Wrong

67. A - The number of WBC decreases in leukemia

R - Leukemia means blood cancer

- (a) A & R both are Wrong
- (b) A & R both are Right
- (c) A is Wrong & R is Right
- (d) A is Right & R is Wrong

68. A - Barbiturates is a synthetic drug which gives pleasure.

R - By taking barbiturates the adrenalin increase in blood.

- (a) A & R both are right & R is not the reason of A.
- (b) A & R both are right & R is not the reason of A.

- (c) A is Right & R is Wrong.  
 (d) A & R both are Wrong.
69. A - Macrophage act as a factory of HIV  
 R - Macrophage continuously produces molecules of HIV  
 (a) A & R both are right but R is not explanation of A.  
 (b) A & R both are right & R is explanation of A.  
 (c) A is Right & R is Wrong.  
 (d) A & R both are Wrong.
70. A - Human is first host of filarial worm  
 R - Filarial worm is viviparous  
 (a) A & R both are right & R is not reason of A.  
 (b) A & R both are right & R is reason of A.  
 (c) A is Right & R is Wrong.  
 (d) A & R are Wrong.
71. Which one is Right for X & Y ?  
 X - Marijuana is obtained from cannabis sativa.  
 Y - By using of this kind of drug pupil gets dilated & level of suger rises in blood.  
 (a) X & Y both are Right & Y is the reason of X.  
 (b) X & Y both are Right & Y is not correct reason of X.  
 (c) X is Right & Y is Wrong.  
 (d) Y is Right & X is Wrong.
72. Which one is Right for X & Y ?  
 X - In tobacco only Nicotine is present.  
 Y - Nicotine stimulates adrenal gland.  
 (a) X & Y both are Right & Y is correct reason of X.  
 (b) X & Y are Right & Y is not correct reason of X.  
 (c) X is Wrong & Y is Right.  
 (d) X is Right & Y is Wrong
73. Which one is correct for X & Y ?  
 X - Rhino Virus cause common cold.  
 Y - It infects nose, respiratory passage & lungs.  
 (a) X & Y both are correct & Y is correct explanation of X.  
 (b) X & Y both are Right & Y is not correct explanation of X.  
 (c) X is Right but Y is Wrong.  
 (d) X is Wrong but Y is Right.
74. Which one is correct for X, Y & Z ?  
 X - Trophozoite is formed in RBC.=  
 Y - Haemoglobin is broken down by haemozoin.

- Z - In RBC merozoite converted into gamatocyte.
- (a) X & Y are Right & Z is Wrong.  
 (b) X & Z are Right & Y is Wrong.  
 (c) Y & Z are Right & X is Wrong.  
 (d) X & Z are Wrong & Y is Right.
75. Which one is correct sentence for X, Y & Z ?
- X - The period between 12-18 years of a child is known as adolescence.  
 Y - In Adolescence period they become addict & escape from facing problems.  
 Z - To remove this bad habit of taking drugs & alcohol, there should be propagation through newspaper, films, internet, television.
- (a) X, Y & Z are right.  
 (b) X & Z are right & Y is wrong.  
 (c) X & Y right & Z is is wrong.  
 (d) X, Y & Z are wrong.
76. Which one is correct for X, Y & Z ?
- X - The excess response of the immune system to certain antigens present in the environment is called allergy.  
 Y - Allergies take place due to the release of chemicals like serotonin & histamine from mast cells.  
 Z - Adrenalin like medicine quickly reduce the symptoms of allergy.
- (a) X, Y & Z all are right.  
 (b) X & Y both are right & Z is wrong.  
 (c) X, Y, & Z all are wrong.  
 (d) X & Z are right & Y is wrong.
77. Select correct option for the given statements.
- Statement X - Carrier of HIV virus person appears Healthy.  
 Statement Y - Bodyache lasting over four weeks in ARC.  
 Statement Z - Loss of body weight by 10% without any reason occurs in the AIDS at the final stage.
- (a) Statement X, Y & Z all are wrong.  
 (b) Statement X & Y are wrong but Z is Right.  
 (c) Statement X & Z are wrong but Y is Right.  
 (d) Statement X, Y & Z are Right.
78. Statement X :- If antibodies fight against antigen in immunity it's called Humoral immune response.  
 Statement Y :- Antibodies found in blood.
- (a) Statement X & Y both are Right & Y is the reason of X.  
 (b) Statement X & Y both are Right & Y is not correct explanation of X.  
 (c) X is Right & Y is Wrong.  
 (d) X & Y both are Wrong.

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79. In which country plant given in diagram appear ?

- (a) South America
- (b) Uganda
- (c) Africa
- (d) India



80. Which Kind of Sedative chemical is obtained from given plant ?



- (a) Hashish
- (b) Cannabinoids
- (c) Cocaine
- (d) Opium

81. Which one is right for given sentence X, Y & Z ?

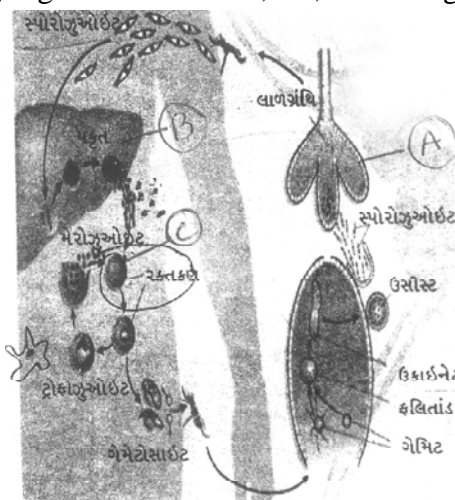
X - Amphetamites is a stimulating pill.

Y - Barbiturates gives pleasure to the person which is natural medicine.

Z - Hashish & Cannabis are obtained from female flowers of plant.

- (a) X is wrong & Y & Z are right.
- (b) X, Y & Z all are Right.
- (c) X & Z are Right & Y is Wrong.
- (d) X & Y are Right & Z is Wrong.

82. Which Host is indicated by region labled as "a", "b", "c" in the given diagram?



- (a) A & B Human, C - Mosquito
- (b) B - Human, A & C - Mosquito
- (c) A - Mosquito, B & C - Human
- (d) A - Human, B & C - Mosquito

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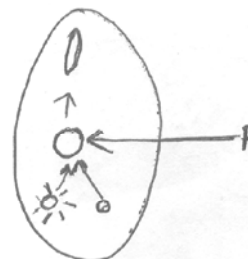
83. Which one is responsible of the disease from the given figure

- (a) Culex Mosquito
- (b) Filarial Worm
- (c) Anopheles Mosquito
- (d) Plasmodium



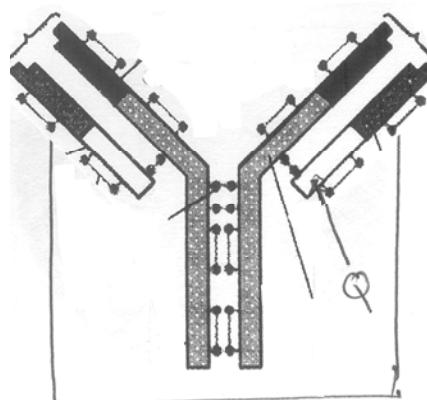
84. The life cycle of Anopheles mosquito is given in figure. So what indicates "P" from it ?

- (a) Gamates
- (b) Zygote
- (c) Oocyst
- (d) Sporozoiter



85. Give the name P, Q, R from given figure

- (a) P - antigen binding site  
Q - Light constant region  
R - Non-variable rignon of Heavy Chain
- (b) P - antigen binding site  
Q - Light constant region  
R - Variable region of Heavy Chain
- (c) P - disulphide bond  
Q - antigen binding site  
R - variable region of heavy chain
- (d) P - antigen binding site  
Q - antibody binding site  
R - sulphide bond



86. Give the correct sentences.

- (i) Passive immunity - Antibody are directly introduces in body
  - (ii) Lactation - Secretion of yellowish fluid colostrums
  - (iii) Hepatitis B - Made from fungi
  - (iv) Histamine - Produce from Heparin
- (a) ii & iii                      (b) i & iii  
(c) i, ii & iii                    (d) i, ii, iii & iv

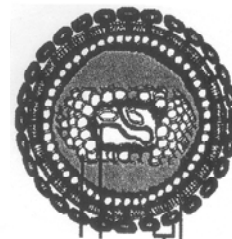
87. Which one is responsible for doing disease shown in figure ?

- (a) Microsporum
- (b) Trichophyton
- (c) Epidermophyton
- (d) All of the given



88. From given diagram identify virus then give the name of sugar in structure of nucleic acid ?

- (a) Ribose
- (b) Deoxyribose
- (c) both a & b
- (d) none of these



89. Which kind of drug are obtained from given plant ?

- (a) Cannabinoids
- (b) Charas
- (c) Ganja
- (d) All of these



90. What is there as a genetic material in HIV in addition to protein layer ?

(CBSE 1998)

- (a) The chains containing DNA
- (b) One chains containing DNA
- (c) Two chains containing RNA
- (d) One chains containing RNA

91. Who is Responsible for typhoid ?

(CBSE 1998)

- (a) Vibrio Cholera      (b) Salmonella      (c) Shingella      (d) Eschericia Coli

92. AIDS spread by....

(MP PMT 1998)

- (a) Blood Transfusion      (b) Shaking Hands
- (c) HIV infected blood transfusion      (d) All of above

93. Which is blood cancer ?

(MP PMT 1998)

- (a) Chloremia      (b) Leukemia
- (c) Uremia      (d) Protemia

94. Which disease is spread by mosquito but does not occurs by virus ?

(CPMT 1998)

- (a) Meningities      (b) Dengue fever
- (c) Yellow fever      (d) Filarisis

95. HIV decrease...

(MP PMT 1997)

- (a) Helper T-Cells      (b) All T-Cells
- (c) Only B-Cells      (d) B-Cell & T-Cell

96. The molecule, which stimulates the immune response is...

(PMT 1997)

- (a) Antibody      (b) Antigen
- (c) Mutant      (d) Carcinogen

97. Response against allergic inflammation, is given by which substance produced by mast cells ?

(MP PMT 1997)

- (a) Histamine      (b) Antibody
- (c) Antigen      (d) None

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98. By which AIDS spread ?  
 (a) Blood Cancer (b) T-Cell leukemia virus of Human  
 (c) Bacterium (d) TMV
99. What are interferons ? (CBSE 2001)  
 (a) Antiviral Protien (b) Antibacterial Protien  
 (c) Anticancer Protien (d) Conjugated Protien
100. The growing immunity, after getting the disease free body (PMT 1996)  
 (a) Active acquired immunity (b) Passiue acquired immunity  
 (c) a & b both (d) None
101. Cancer is associated with.... (MP CPMT 1996)  
 (a) Uncontrollable growth of tissue (b) Ageing procers  
 (c) Controlled division of tissue (d) None
102. Vaccination protects from disease, Because... (BHU 1999)  
 (a) It helps in digestion (b) It increases the no. of RBCs  
 (c) It produces antibodies (d) It maintains heat system of the body
103. Whose number increase during allergy ? (Manipal 1999)  
 (a) Ig A (b) Ig E (c) Ig G (d) Ig M
104. Where salmonella is associated ? (CBSE 2001)  
 (a) Typhoid (b) Polio (c) TB (d) Tetanus
105. Which is most infectious disease ? (CBSE 2001)  
 (a) Hepatitis - B (b) AIDS (c) Cough & Comman Cold (d) Malaria
106. By whom influenza occurs ? (BHU 2002)  
 (a) Virus (b) Bacteria (c) Fungi (d) Protista
107. By What antibodies are made ? (CBSE 2003)  
 (a) RBCs (b) Thrombocytes (c) Monocytes (d) Lymphocytes
108. Carcinoma refer to... (CBSE, PMT 2003)  
 (a) Malignant tumours of the connective tissue  
 (b) Malignant tumours of the skin or mucous membrane  
 (c) Malignant tumours of the colon  
 (d) Begign tumours of the connective tissue
109. Which cancer affects lymph gland and spleen ? (PMT 2004)  
 (a) Carcinoma (b) Surcoma (c) Leukemia (d) Lymphoma
110. Where memory cells are formed ? (DPMT 2005)  
 (a) Monocytes (b) Eosinophills (c) Neutrophills (d) Lymphocytes
111. By what we get passive immunity ?  
 (a) Antibody (b) Antigen (c) Antibiotic (d) Vaccination
112. Antibodies in our body are complex ? (CBSE, PMT 2006)  
 (a) Steroid (b) Prostaglandins (c) Glycoproteins (d) Lipoprotein

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113. What is destroyed by HIV first of all ? (CBSE 2006)  
 (a) Leukocytes (b) Thrombocytes  
 (c) Helper T-Lymphocytes (d) B-Lymphocytes
114. What is antibody ? (DPMT 1982)  
 (a) Phagocyte (b) Protein which inactivate antigen  
 (c) A part of RBCs (d) A part of Plasma
115. Barrier preventing entry of pathogens  
 (a) Skin (b) Mucous layer (c) Mucous secretion (d) Cilia
116. Which of the following is laboratory test for diagnosis of cancer ?  
 (a) Pap smear (b) Mamography (c) Barium test (d) PSA
117. In which of the following situation infection of AIDS do not occur ?  
 (a) Breast feeding to children by AIDS infected mother  
 (b) Foetus of AIDS infected mother  
 (c) Utilization of clothes used by AIDS patient.  
 (d) Utilization of syringe used by AIDS patient.
118. An ovoviviparous parasite is... (APMEE 2001)  
 (a) Ascaris (b) Taenia  
 (c) Wuchereria (d) Plasmodium
119. Salmonella is related with... (CBSE, PMT 2001)  
 (a) Typhoid (b) Polio  
 (c) TB (d) Tetanus
120. Which one of the following is not correctly matched ? (CBSE, PMT 2004)  
 (a) Anopheles culifacies - Leishmaniasis (b) Glossina palpalis - Sleeping sickness  
 (c) Culex pipiens - Filariasis (d) Aedes aegypti - Yellow fever
121. The function of Ig E is... (Kerala 2007)  
 (a) To mediate in allergic response  
 (b) Activation of B-Cells  
 (c) Protection from inhaled and ingested pathogen  
 (d) Stimulation of complement system, passive immunity to foetus.
122. An auto immune disease is... (Orissa 2004)  
 (a) Cancer (b) Erythroblastosis foetalis  
 (c) Asthma (d) Rheumatoid arthritis
123. Sporogony of malarial parasite occurs in... (DPMT 2004)  
 (a) Liver of man (b) Stomach wall of mosquito  
 (c) RBCs of man (d) Salivary gland of mosquito
124. Incubation period for plasmodium falciparum is... (AMU 2003)  
 (a) 12 days (b) 15 days (c) 20 days (d) 30 days



125. ELISA is... (Karnataka 2007)
- (a) Enzyme linked immunoabsorbant assay
  - (b) Enzyme linked ions assay
  - (c) Enzyme linked inductive assay
  - (d) None of the above
126. Confirmatory test for AIDS is... (Kerala 2004)
- (a) Western blot                      (b) ESR
  - (c) ELISA                                (d) PCR
127. Carcinoma refers to...
- (a) Malignant tumours of the connective tissue
  - (b) Malignant tumours of the skin or mucous membrane
  - (c) Malignant tumours of the colon
  - (d) benign tumours of the connective tissue
128. Post erythrocytic part of life cycle of plasmodium is called....
- (a) golgi cycle                      (b) short cycle
  - (c) krebs cycle                      (d) Ross cycle
- (Hint : In Hydrabad Ronald Ross had done his research related to malarial parasite)

**ANSWER KEY**

1	d	33	d	65	b	97	a
2	d	34	b	66	a	98	b
3	a	35	a	67	c	99	a
4	c	36	a	68	c	100	a
5	c	37	b	69	b	101	a
6	d	38	d	70	a	102	c
7	d	39	c	71	a	103	b
8	d	40	d	72	c	104	a
9	c	41	a	73	c	105	c
10	d	42	d	74	b	106	a
11	c	43	b	75	b	107	d
12	d	44	d	76	a	108	a
13	d	45	d	77	d	109	b
14	c	46	d	78	a	110	d
15	c	47	b	79	a	111	a
16	a	48	d	80	c	112	c
17	b	49	a	81	c	113	c
18	d	50	c	82	c	114	b
19	c	51	c	83	b	115	b
20	c	52	b	84	b	116	d
21	d	53	b	85	b	117	c
22	d	54	a	86	c	118	c
23	b	55	c	87	d	119	a
24	d	56	d	88	a	120	a
25	c	57	a	89	d	121	a
26	a	58	c	90	d	122	d
27	b	59	a	91	b	123	b
28	d	60	a	92	c	124	a
29	c	61	d	93	b	125	a
30	d	62	b	94	a	126	a
31	b	63	c	95	a	127	b
32	b	64	c	96	b	128	d



## Unit -VIII

### Chapter-10. Microbes and Human Welfare

#### IMPORTANT POINTS

Virus, bacteria, fungi, algae, protozoan are microscopic in size hence known as microbes or microorganism. These are harmful as well as useful to human being. They are found in all types of habitats.

They are exploited in different fields by modern technology. Bacteria and fungi are used in making household products such as curd, dosa and idli, bread, beverages etc. Different types of pharmaceutical products are the result of reaction done by microbes. They produce antibodies, carbon dioxide, alcohol, enzymes, protein, steroids etc. Microbes are important in fuel energy production.

Sewage treatment plants and biogas plants are possible due to such of microbes only. Biogas is a mixture of methane,  $\text{CO}_2$ , and which are used in fuel energy.

Bacteria, fungi, algae, virus are used in biocontrol and biofertilisers in agriculture. We should use such chemical instead of synthetic artificial chemical in our life cycle.

- Which organisms are useful for the knowledge of biotechnology and genetic engineering ?  
 (a) Animals (b) Plants  
 (c) Micro Organism (d) None of them
- Which bacteria gives protection against gastric injury ?  
 (a) Methenogins (b) Lacto Bacillus  
 (c) Lacto Cocas (d) Lacto Strepto
- Which micro-organism are useful in fermentation of dough for the idli and dhosa ?  
 (a) Bacteria (b) Protozua  
 (c) Fungus (d) Virus
- Which is useful to obtain acetic acid ?  
 (a) Aspergillus niger (b) Clostridium Butirycun  
 (c) Acetobactor aceti (d) Saech arhomyces Cerreui Siae
- Which is one correct for the amino acid ?  
 (a) L-melic acid (b) L-Lycin  
 (c) L-aluconic Acid (d) (a) & (c) both
- Which is useful to remove the oily stains in laundry ?  
 (a) Renin (b) Protease (c) Amaylase (d) Lipase
- Which one correct option for fermentation ?  
 (a) To prepare pickle from vegetable and savour fruits  
 (b) To prepare food for cattle  
 (c) To prepare some vitamins  
 (d) In production of some Enzymes

8. Which is useful to remove weeds in agriculture ?  
 (a) Pesticides                      (b) Weedicide                      (c) Fungicide                      (d) Insecticides
9. Which metabolic process is performed by bacteria in biogas plant ?  
 (a) Aerobic Respiration                      (b) Cellular Respiration  
 (c) Anaerobic Respiration                      (d) Internal Respiration
10. IARI means.....  
 (a) India Agriculture Research Institute  
 (b) International Agrochemical Research Institute  
 (c) Indian Agrochemical Research Institute  
 (d) Indian Agriculture Resource Institute
11. Which organism is useful to form biofertiliser ?  
 (a) Glomus    (b) Cyanobacteria  
 (c) Azospirillum    (d) All the given
12. Which organic compound is useful to prepare Ensilage ?  
 (a) Vitamin    (b) Protein  
 (c) Lipid    (d) Carbohydrates
13. Which one is produced by the help of *Arebia gossypae* ?  
 (a) Riboflavin    (b) Steroids    (c) Statins    (d) Lysin
14. Which is irrelevant for mycorrhiza ?  
 (a) Absorb of phosphorous    (b) Increase Immunity  
 (c) Fixation of Free N<sub>2</sub>    (d) Protectes against salinity and draught
15. Which group is true for the Enzymes of micro organism ?  
 (a) Amylase, Protease, Lipase, Protease.  
 (b) Glycin, Renin, Lipase, Melic Acid  
 (c) Lipase, Protease, Lipase, Amylase  
 (d) Glyconic acid, protease, Lipase, Amylose
16. Which fungus is useful to prepare bread ?  
 (a) *Rhizopus nigricans*    (b) *Saecharhomyces Cerrevisiae*  
 (c) *Clostridium Butiryicum*    (d) *Asper Gillus Niger*
17. Find odd sentences out :-  
 (a) Ethenol is used as a fuel in Brazil.  
 (b) Toddy is prepared from palm tree in north India.  
 (c) Micro organism are useful to prepare enzymes, protienes and steriods.  
 (d) Penicillin is prepared from penicillium notatum.
18. Which micro organism is useful to obtain short chain fatty acids ?  
 (a) *Saecharhomyces Cerrevisiae*    (b) *Azeto bacter aciti*  
 (c) *Clostridium butiryicum*    (d) *Aspergillus niger*

19. My chorrhiza means.....
  - (a) Symbiosis between fungus and plants
  - (b) Symbiosis between plant and bacteria
  - (c) Symbiosis between algae and fungus
  - (d) Symbiosis between michorrhiza of fungus of water and bacteria
20. In production of which carbonic acid, *Aspergillus niger* is useful ?
  - (a) Citric acid
  - (b) Butyric acid
  - (c) Acetic acid
  - (d) Palmitic acid
21. Which one is related with steriods ?
  - (a) Citric acid
  - (b) Butyric acid
  - (c) Acetic acid
  - (d) Palmitic acid
22. Which is used to prevent blood clotting in blood vessels ?
  - (a) Steriods
  - (b) Cyclo sporin-A
  - (c) Streptokinase
  - (d) Stetins
23. Which is to be used in production of swiss cheese ?
  - (a) *Monoscus Purpureus*
  - (b) *Clostridium bacterium*
  - (c) *Lacto Bacillus*
  - (d) *Saecharhomyces Cerrevisiae*
24. Which option is related with the utility of lectic acid ?
  - (a) In fermentation, to prepare pickle
  - (b) useful for preparing curd from milk
  - (c) To increase the quality of vitamin B<sub>12</sub>
  - (d) All the given.
25. Which one is useful as a immunosuppressive agent in organ transplant ?
  - (a) Cyclosporin-C
  - (b) Cyclosporin-L
  - (c) Cyclosporin-A
  - (d) All the given
26. Which bacteria is useful for purification in sewage treatment ?
  - (a) Hetrotrops
  - (b) Symbiont
  - (c) Free living
  - (d) Parasist
27. Which assertion is correct ?
  - (a) There is role of ministry of forest and environment in developing biogas technology.
  - (b) Micro organism are used as a bio control agent by IARI.
  - (c) Biofertilisers are used over chemical fertilizer to redused pollution.
  - (d) Chemical fertiliser are used to form biofertiliser.
28. To which, function baculo virus is involve ?
  - (a) Produces deases some arthropods and insect.
  - (b) Produces deases in todes neme.
  - (c) Produces deases in fungus.
  - (d) Produces Insectisides.
29. Which one is related with monoscus pupurous ?
  - (a) Streptokinase - To prevent blood clotting.
  - (b) Cyclosporin- A - Immunosuppresser
  - (c) Stetins - Decreases the cholesterole in blood
  - (d) All the given

30. Full form of BOD.  
 (a) Biological Oxygen Demand                      (b) Bio Oxygen Demand  
 (c) Biochemical Oxygen Demand                  (d) Biochemical Oxygen Degreadable
31. Which is the group of autotroph micro organisms ?  
 (a) Anabaena, Nostoc, Glomus, Trichoderma  
 (b) Aceletoria, Anabaena, Cynobacteria, Rhizopus.  
 (c) Nostoc, Aspergillus, Anabaena, Rhizopus  
 (d) Acelatoria, Anabaena, Nostoc, Cynobacteria.
32. By which process floating debris and grit are removed in STPs respectively ?  
 (a) Filtration and Sedimentation                  (b) Filtration and Distilation  
 (c) Sedimentation and Filtration                  (d) Only Filtration
33. Which is useful to control Nematodes in cearel crops ?  
 (a) Bionemotocides      (b) Fungicides              (c) Weedicides              (d) Incecticeides
34. Which sentence is odd ?  
 (a) Progesteron is useful as a immuno suppressor  
 (b) Stetins is useful to reduce cholesterole  
 (c) Streptokines is useful to prevent blood clotting  
 (d) Lipase is useful to remove oily stains
35. Which micro organism is involved in flocks as well as in michorrhiza ?  
 (a) Bacteria                      (b) Virus                      (c) Fungus                      (d) Algae
36. Find odd group out :-  
 (a) Carbomycin, bactitracin, tetracytidine, fumagillin  
 (b) Butaric acid, Isotric acid, Lectic acid, Melic acid  
 (c) Amylase, Protease, Lipase, Csellulase  
 (d) Glucomylase, Renin, Glucose Oxicide
37. Which pest is obtained from Pseudononas ?  
 (a) Quantum-400              (b) Quantum-4000              (c) Quantum-40000              (d) Quantum-40
38. Which organism is useful to prepare Alcohol ?  
 (a) Saccherohmy Ceribicie                              (b) Streptomycis Saccheromysis  
 (c) Streptococus cerbicie                              (d) Saccherohmycis Cerevisiae
39. Which pair is odd ?  
 (a) Rhizobium-Symbiotic bacteria                      (b) Glamus-Symbiotic fungus  
 (c) Trichoderma-Free living bactaria                      (d) Azatobector-Free living bactaria
40. Which is correct sequence for purification process of STPs ?  
 (a) Primary Sludge → Effluent → Flocks → Active Sludge → Biogas  
 (b) Flocks → Primary Sludge → Effluent → Active Sludge → Biogas  
 (c) Primary Sludge → Effluent → Active Sludge → Flocks → Biogas  
 (d) Effluent → Flocks → Primary Sludge → Active Sludge → Biogas

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41. Which product is synthesized by micro organism at commercial level for mankind ?  
 (a) Vaccine (b) Biofuel (c) Alcohol (d) All the given
42. Effluent means....  
 (a) Water remaining under the primary sludge.  
 (b) Solid compounds of the sedimentation  
 (c) Water remaining over the primary sludge  
 (d) Flocks forms from the primary sludge.
43. Which group of micro organism is useful as a bio control agent ?  
 (a) Cyanobacteria, Bacula virus, Trichoderma  
 (b) Trichoderma, Psuedomonas, Bacillus Thuringiensis  
 (c) Rhizobium, Cyanobacteria, Psuedomonas  
 (d) All the given
44. Which gases are there in biogas ?  
 (a)  $CH_4$ ,  $CO_2$ ,  $H_2S$  (b)  $CH_3$ ,  $CO_2$ ,  $H_2S$   
 (c)  $CH_2$ ,  $CO_2$ ,  $H_2S$  (d)  $CH_3$ ,  $CO_2$ ,  $H_2S$
45. Which bacteria are useful in anaerobic sludge digesters tank ?  
 (a) Hypogeal (b) Aerobic (c) Free living (d) Anaerobic
46. Which one correct for the free living and symbiotic fungus ?  
 (a) Glomus and Rhizopus (b) Glomus and Azospirillum  
 (c) Trichoderma and Rhizopus (d) Trichoderma and Azospirillum
47. Formation of flocks means....  
 (a) Association of virus with the bacteria remains in water  
 (b) Bacteria which associated with the mycorrhiza of the fungus of water  
 (c) Bacteria which associated with the mycorrhiza of the fungus of soil  
 (d) Bacteria which associated with the solid waste of the water
48. In which tank flocks is sedimented and forms respectively ?  
 (a) Settling tank, Aeration tank (b) Aeration tank, Effluent tank  
 (c) Aeration tank, Settling tank (d) Effluent tank, Anaerobic tank
49. Who has established Ganga nad Yamuna action plan ?  
 (a) IARI (b) KVIC  
 (c) Ministry of forest and Environment (d) Integrated pest control management
50. What is sedimented flocks ?  
 (a) Passive sludge (b) Primary sludge (c) Active sludge (d) None of them
51. Which statement is correct for STPs ?  
 (a) Value of BOD is decrease in effluent. (b) Flocks is sedimented in settling tank.  
 (c) At end of process biogas is formed. (d) All the given
52. Which odd for mixed gases which produces in anaerobic sludge digesters ?  
 (a)  $CO_2$  (b)  $CH_4$  (c)  $H_2S$  (d)  $CH_3$

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53. Which bacteria is remain in alimentary canal of herbivorus ?  
 (a) Azetobactor                      (b) Methenogens                      (c) Azospirillum                      (d) Bacillus
54. Which biological process will take place in STPs ?  
 (a) Flocks                      (b) Filteration                      (c) Sedimentation                      (d) (b) & (c) both
55. What is indirectly called the measurment of organic matter of water ?  
 (a) BOD                      (b) DOB                      (c) COD                      (d) DOC
56. From which compound methane gas is produced by bacteria ?  
 (a) lipase                      (b) Amylase                      (c) Cellulase                      (d) Protease
57. Which gas will produced in anearobic sludge digesteres ?  
 (a) CO<sub>2</sub>                      (b) H<sub>2</sub>S                      (c) CH<sub>4</sub>                      (d) All the given
58. Which micro organism is irrelevant as a biocontrol agent ?  
 (a) Virus                      (b) Bectaria                      (c) Algae                      (d) Fungus
59. Which scientist has invented Antibodies ?  
 (a) Ernest chain                      (b) Howard Florey                      (c) Alexander Fleming                      (d) W.Fleming  
 (KCET 2004)
60. Which bacterial group is useful in biogas production ?  
 (a) Rhizobium                      (b) Methanogens  
 (c) Argonotrocs                      (d) Eubectaria  
 (JIPMER 2000)
61. Which symbiotic bacteria is N<sub>2</sub> fixative with the root nodule of leguminious plant ?  
 (a) Azospyrillum (b) Clostridium (c) Azotobactor                      (d) Rhizobium  
 (AFMC 1998)
62. Which living organism works as bio-fertiliser ?  
 (a) Azzola                      (b) Clostridium (c) Azotobactor                      (d) Rhizobium  
 (PMT 1998)
63. Which micro organism is useful in production of citric acid ?  
 (a) Azotobactor                      (b) Penicillium                      (c) Asperzilus niger                      (d) Clostridium  
 (CBSEPMT 1995)
64. By which process cheese and toddy is obtained ?  
 (a) Fermantation (b) Distillation                      (c) Pasuirisation                      (d) Hydrolisis  
 (PMT 1998)
65. To which BOD is related ?  
 (a) Microbes and organic matters                      (b) Organic compound  
 (c) Microbes                      (d) None of them  
 (MP MPT 2002)
66. Which organism is useful to produce Riboflavin ?  
 (a) Arabia hossipae                      (b) Saccharhomyces Cervisiae  
 (c) (a) & (b) both                      (d) None of them  
 (CBSEPMT 1999)
67. Bacillus thuringiensis is useful in....  
 (a) Bio fertiliser                      (b) Biometalogical                      (c) Biotoxic plant                      (d) Bio product plant  
 (CBSEPMT 2005)
68. Bio fertilizer means.....  
 (a) Crop which shows rapid growth                      (b) Cow dung and agricultural west  
 (c) prepared by Anabaena and Nostoc                      (d) None of them



69. Which pair is correct ? (Kerala PMT 2007)  
 1 - Cynobacteria - Bio pesticides  
 2 - Mycorrhiza - Absorption of phosphorus  
 3 - Bacillus thuringiensis - toxin  
 4 - Single cell protein - Rhizobium  
 (a) 2 (b) 3 (c) 1 (d) 4
70. Which pair is odd ? (CBSE PMT 2007)  
 (a) Yeast - Ethanol (b) Penicillium - Penicillin  
 (c) Methanogens - Biogas (d) Streptococcus - Strep
71. What is value of BOD of sewage water in comparison to normal water ?  
 (a) More (b) Less (c) Normal (d) Zero
72. Which pair is correct ? (AIIMS 2003)  
 (a) Rhizobium - Parasites of leguminous plant (b) Mycorrhiza - Absorption of Phosphate  
 (c) Yeast - Biogas production (d) Nostoc - Biofuel
73. According to latest news BT cotton is widely cultivated, in that Bt cotton means....  
 (a) Bigger thread variety  
 (b) Cotton seeds treated with Barium  
 (c) Produced by biotechnological enzymes restriction endonuclease  
 (d) Contains Endotoxin gene of B.T.
74. Which are the main components of biogas ?  
 (a)  $\text{CH}_4 + \text{CO}_2 + \text{N}_2$  (b)  $\text{CO}_2 + \text{H}_2\text{O}$   
 (c)  $\text{CH}_3 + \text{O}_2$  (d)  $\text{CO}_2 + \text{H}_2$
75. Azospirillum and Azotobacter for example of.....  
 (a) Decomposers (b) Free living  $\text{N}_2$  fixative  
 (c) Symbiotic  $\text{N}_2$  fixative (d) Pathogen
76. How the ethanol is produced in industrial field ?  
 (a) Saccharomyces (b) Clostridium  
 (c) Aspergillus (d) Streptomyces
77. Which option provides fertilizer as well as energy ?  
 (a) Rhizobium (b) Biogas  
 (c) Fuel Plant (d) All the given
78. Which one is true information for toxin Bt ?  
 (a) Bt protein contains active toxins in bacillus  
 (b) Active toxin enters into the ovary of insects and makes it sterile so as to stop the reproduction.  
 (c) Bacillus contains antitoxin material  
 (d) Toxin enters into the alimentary canal of insects which results lethal for the insect.

79. By BOD which one is to be measured ?
- Amount of organic matters of water.
  - Industrial waste of water Resources.
  - Amount of co which connected with Hb.
  - Amount of required O<sub>2</sub> for dark reaction of green plants.

**Column Type Questions**

80. Match the following

**Column-I**

- (P) Cyclosporin-A  
 (Q) Hydroxi Projegteron  
 (R) Stetins  
 (S) Riboflavin  
 (a) (P-iv) (Q-ii) (R-i) (S-iii)  
 (c) (P-iii) (Q-i) (R-ii) (S-iv)

**Column-II**

- (i) Rhizopus nigricans  
 (ii) Monascus Purpureus  
 (iii) Arebia Gossipi  
 (iv) Trhichoderma polysporum  
 (b) (P-iii) (Q-i) (R-ii) (S-iv)  
 (d) (P-iii) (Q-i) (R-iii) (S-ii)

81. Match the following

**Column-I**

- (P) Aspergillus niger  
 (Q) Clostridium butiricum  
 (R) Azatobactor  
 (S) Lactobacillus  
 (a) (S-i) (P-ii) (Q-iii) (R-iv)  
 (c) (R-i) (P-ii) (Q-iii) (S-iv)

**Column-II**

- (i) Butyric acid  
 (ii) Acetic acid  
 (iii) Lactic acid  
 (iv) Citric acid  
 (b) (Q-i) (R-ii) (S-iii) (P-iv)  
 (d) (P-i) (Q-ii) (S-iii) (S-iv)

82. Match the following

**Column-I**

- (P) Cynobacteria  
 (Q) Pseudomonas  
 (R) Rhizobium  
 (S) Methenogens  
 (a) (R-i) (S-ii) (Q-iii) (P-iv)  
 (c) (R-i) (P-ii) (S-iii) (Q-iv)

**Column-II**

- (i) N<sub>2</sub>-fixation  
 (ii) Biogas  
 (iii) Biofertilisersin peddy fields  
 (iv) Quantam-4000  
 (b) (S-i) (Q-ii) (P-iii) (R-iv)  
 (d) (R-i) (S-ii) (P-iii) (Q-iv)

83. Match the following

**Column-I**

- (P) Blue green Algae  
 (Q) Baculo virus  
 (R) Bacillus thariengensis  
 (S) Trichoderma  
 (a) (Q-i) (R-ii) (S-iii) (P-iv)  
 (c) (Q-i) (P-ii) (R-iv) (S-iii)

**Column-II**

- (i) Pathogenes effect some arthropods  
 (ii) Increase organic matters in soil  
 (iii) Bio control  
 (iv) Produced toxin  
 (b) (P-i) (Q-ii) (R-iii) (S-iv)  
 (d) (R-i) (S-ii) (P-iii) (Q-iv)

84. Match the following

**Column-I**

- (P) Streptokinase
- (Q) Penicillin
- (R) Stetins
- (S) Cyclosporin-A
- (a) (P-i) (Q-ii) (R-iii) (S-iv)
- (c) (R-i) (P -ii) (Q-iii) (S-iv)

**Column-II**

- (i) To prevent blood clotting
- (ii) To decrease cholesterol
- (iii) Immunosuppressor
- (iv) Antibiotic
- (b) (P-i) (R-ii) (S-iii) (Q-iv)
- (d) (S-i) (R-ii) (P-iii) (Q-iv)

85. Match the following

**Column-I**

- (P) BOD
- (Q) Flocks
- (R) Encilage
- (S) Biogas
- (a) (R-i) (Q-ii) (P-iii) (S-iv)
- (c) (P-i) (S-ii) (R-iii) (Q-iv)

**Column-II**

- (i) Food for cattle
- (ii) Association of Bacteria and filaments of mold in water
- (iii) Measure of the organic matter in a water
- (iv) Anaerobic metabolism on biowaste
- (b) (Q-i) (R-ii) (S-iii) (P-iv)
- (d) (S-i) (P-ii) (S-iii) (R-iv)

86. Match the following

**Column-I**

- (P) Rhizobium
- (Q) Anabaena
- (R) Azotobacter
- (S) Glomus
- (a) (P-i) (Q-ii) (R-iii) (S-iv)
- (c) (P-iii) (Q-i) (R-ii) (S-iv)

**Column-II**

- (i) Leguminous
- (ii) Autotroph  $N_2$ -fixative
- (iii) Freelifving  $N_2$ -fixative
- (iv) Phosphorus absorption
- (b) (Q-i) (P-ii) (R-iii) (S-iv)
- (d) (P-i) (Q-ii) (R-iv) (S-iii)

**Statement (A) and Reason (R) Type Question**

- (a) Both A and R are true and R is correct explanation of A.
- (b) Both A and R are true but R is not correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

87. A :- Lab improves quality of vitamin- $B_{12}$

R :- Lactobacillus bectaria produces lactic acid.

- (a) (b) (c) (d)

88. A :- Cyclosporin-A is used as an Immunosuppressore.

R :- Cyclosporin-A is obtained from Trichoderma.

- (a) (b) (c) (d)

89. A :- Encilage is food for cattle.  
 R :- Encilage is produced by fermentatation of protien of green plant tissue.  
 (a) (b) 0 (c) (d)
90. A :- Dung of cattle is used to produced biogas.  
 R :- There are large number of methenogonic bacteria in dung of cattle.  
 (a) (b) (c) (d)
91. A:- As an alternative to chemicals, biochemicals are produced through biocontrol agent.  
 R :- Using biochemicals, natural balance is maintained.  
 (a) (b) (c) (d)
92. A :- Photosynthetic bacteria produced to  $N_2$ .  
 R :- Bacteria are able to convert solar energy into chemical energy.  
 (a) (b) (c) (d)
93. A :- Protease enzymes are produced by micro organisms.  
 R :- Bacteria enzymes are used to remove oily stains in laundry.  
 (a) (b) (c) (d)
94. A :- Aerobic bacteria forms flocks by associating with michoriaza.  
 R :- Upper free water which remain over primary sludge is called effluent.  
 (a) (b) (c) (d)
95. A :- BT is useful to control pest of crops.  
 R :- Some species of fungus also use as a pest control.  
 (a) (b) (c) (d)
96. A :- Trichoderma absorb phosporos for the plant.  
 R :- Quantum-4000 is obtained from psuedomonas.  
 (a) (b) (c) (d)
97. A :- L-Lycine is kind of amino acid.  
 R :- Pickle are the result of citric acid fermentatation of fruits like citrus and vegetables.  
 (a) (b) (c) (d)

**ANSWER KEY**

1	C	26	A	51	D	76	C
2	B	27	C	52	D	77	B
3	A	28	A	53	B	78	D
4	C	29	C	54	A	79	A
5	B	30	C	55	A	80	C
6	D	31	D	56	C	81	B
7	D	32	A	57	D	82	D
8	B	33	A	58	C	83	C
9	C	34	A	59	C	84	B
10	A	35	C	60	B	85	A
11	D	36	B	61	D	86	A
12	D	37	B	62	A	87	B
13	A	38	D	63	C	88	B
14	C	39	C	64	A	89	C
15	C	40	A	65	B	90	A
16	B	41	D	66	A	91	A
17	B	42	C	67	C	92	D
18	C	43	B	68	C	93	C
18	A	44	A	69	B	94	B
20	A	45	D	70	D	95	B
21	C	46	B	71	A	96	D
22	C	47	B	72	B	97	C
23	B	48	A	73	D		
24	D	49	C	74	A		
25	C	50	C	75	B		



**Unit -IX****Chapter-11. Biotechnology Principles and processes****IMPORTANT POINTS**

Biotechnology may be defined as the use of microorganisms animals of plants cells of their components to generate products and services useful to human beings.

Genetic engineering and maintenance of sterile condition in chemical engineering process have given the birth to modern biotechnonology.

The basic principles of Recombinant DNA Technology involve the stages like generation of DNA fragments and selection of the desired pieces of DNA, insertion of the selected DNA into a cloning vector i.e. plasmid, to create a recombinant DNA, Introduction of the recombinant vectors into host cells (e.g. Bacteria), multiplication and reflaction of clones containing the recombinant molecules and expression of gene to produce the desired product. The tools required in the recombinant DNA technology include restriction enzymes,cloning vectors and competent host.

The term DNA recombinant technology refer to the transfer of segment of DNA from one organism to another organism (host cell) where it reproduce.The proces involve a sequence of steps like isolation of genetic material,Cutting of DNA at specific site,amplification of gene of interest using PCR,insertion of recombinant DNA into the host cell organism obtaining the foreign gene product and downstream processing.

- (1)The enzymes that cuts specifically recognition sites in the DNA is known as
- |                           |                              |
|---------------------------|------------------------------|
| (a) DNA ligase            | (b) DNA Polymerase           |
| (c) Reverse transcriptase | (d) Restriction endonuclease |
- (2) DNA can be introduced into any cell by
- |                         |                                   |
|-------------------------|-----------------------------------|
| (a) Injection           | (b) being complexed with Ca salts |
| (c) gel electrophoresis | (d) being placed along with       |
- (3) Ability of a plant or animal cell to repeatedly divide and differentiate into a complete organism is :-
- |                          |                         |
|--------------------------|-------------------------|
| (a) cloning              | (b) DNA finger printing |
| (c) cellular totipotency | (d) mitosis             |
- (4) Restriction endonuclease is also known as -
- |                    |                        |
|--------------------|------------------------|
| (a) molecular glue | (b) DNA ligase         |
| (c) DNA Polymerase | (d) molecular scissors |
- (5) Extra chromosomal small cirular double stranded DNA molecule in a bacterial cell is stranded DNA molecule in bacterial cell is
- |             |             |                   |                 |
|-------------|-------------|-------------------|-----------------|
| (a) Plastid | (b) Plasmid | (c) Mitochondrion | (d) Chloroplast |
|-------------|-------------|-------------------|-----------------|

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- (6) Introduction of foreign genes into plant or animal cells using micropipettes is  
(a) Electroporation (b) Chemical - mediated genetransfer  
(c) microinjection (d) Particle gun
- (7) Which one of the following is related with genetic engineering ?  
(a) Mutations (b) Ribosomes (c) Mitochondria (d) Plasmids
- (8) In bacteria, genes for antibiotic resistance are usually located in  
(a) Plasmids (b) Cytoplasm (c) Mitochondria (d) Nucleus
- (9) A technique used to make numerous copies of a specific segment of DNA quickly and accurately  
(a) Translation (b) transcription  
(c) Ligase chain reaction (d) polymerase chain reaction
- (10) The enzyme that cleaves DNA at specific sites, producing sticky ends is called  
(a) Restriction endonuclease (b) Cleaving enzyme  
(c) Lysing enzyme (d) Exonuclease
- (11) Which of the Following is a genetic vector ?  
(a) Plasmid (b) Phage (c) Cosmid (d) All of these
- (12) Restriction endonucleases are used in genetic engineering because -  
(a) They can degrade harmful proteins  
(b) They can join DNA fragments  
(c) They can cut DNA at specific base sequences  
(d) They can cut DNA at variable sites
- (13) Ideal host for the amplification of DNA molecules is  
(a) Viruses (b) Plants (c) Bacteria (d) Animals
- (14) Ti Plasmid naturally occurs in  
(a) Agro bacterium (b) Corynebacterium (c) Staphylococcus (d) Vibrio
- (15) The sticky ends of Fragmented DNA molecules are made up of  
(a) calcium salts (b) endo nuclease (c) un paired bases (d) methyl groups
- (16) Which of the following are the essential requirements for recombination ?  
(a) Single stranded DNA (b) DNA ligase  
(c) DNA Polymerase I (d) All of the above
- (17) The Plasmid derived from E.Coli is  
(a) PBR327 (b) PBR322 (c) both a above (d) None
- (18) Ti Plasmid is useful in  
(a) bringing new genes into animal cells (b) bringing new genes into plant cells  
(c) to nearly any sites on a chromosome (d) bringing tumour cells into plant cells
- (19) Many copies of a DNA molecule in a test tube are procured by  
(a) Polymerase chain reaction (PCR) (b) Molecular chain reaction (MCR)  
(c) Ephemeral chain reaction (ECR) (d) All of these

- (20) Bam H I, ECo R I, Sal I are the types of  
 (a) restriction endonucleases                      (b) restruction endoxidases  
 (c) restriction exonucleases                      (d) restriction polymerases
- (21) Retro viruses have genetic matetial which is  
 (a) DNA                      (b) RNA                      (c) both DAN & RNA                      (d) proteins
- (22) Genetic engineering is possile because  
 (a) the phenomenon of transduction in bacteria is well understood  
 (b) we can see DNA by electron microscope  
 (c) we can cut DNA at specific sites by endonucleases like DNA ase I  
 (d) restrication endonuclease purified from bacteria can be used in vitro
- (23) Plasmids are the suitable vectors for genetic cloning as.....  
 (a) they are indispensible  
 (b) they are self replicating units  
 (c) they are essential for bacterial reproduction  
 (d) None of the above
- (24) Which of the following is used in genetic engineering ?  
 (a) Restriction endonuclease                      (b) Mycobacterium  
 (c) Entameha                      (d) Pepsin
- (25) The first hormone artificially produced by culturing bacteria is \_\_\_\_\_  
 (a) Insulin                      (b) thyroxine                      (c) Testosterone                      (d) Adrenaline
- (26) When the number of genes increases in response to some signal the effect is called.....  
 (a) gene dosage                      (b) Gene pool  
 (c) gene amplification                      (d) gene frequency
- (27) Which one of the following pairs is correctly matched ?  
 (a) RNA polymerase - RNA primer  
 (b) Restriction enzymes - Genetic engineering  
 (c) Central dogma - codon  
 (d) okazaki fragments - splicing
- (28) Plasmids are autonomously replicating mini chromosomes found in.....  
 (a) Bacteriophage lambda                      (b) Leishmania donovani  
 (c) Escherichia coli                      (d) Paramecium caudatum
- (29) Improvement of genotype of an organism by addition of some foreign gene is.....  
 (a) genetic diversity                      (b) gene handing  
 (c) tissue culture                      (d) genetic engineering
- (30) Two bacteria found to be very useful in genetic engineering experiments are.....  
 (a) Nitrosomonas and Klebsiella                      (b) Escherichia and Agrobacterium  
 (c) Nitrobacter and Azotobacter                      (d) Rhizobium and Diplococcus



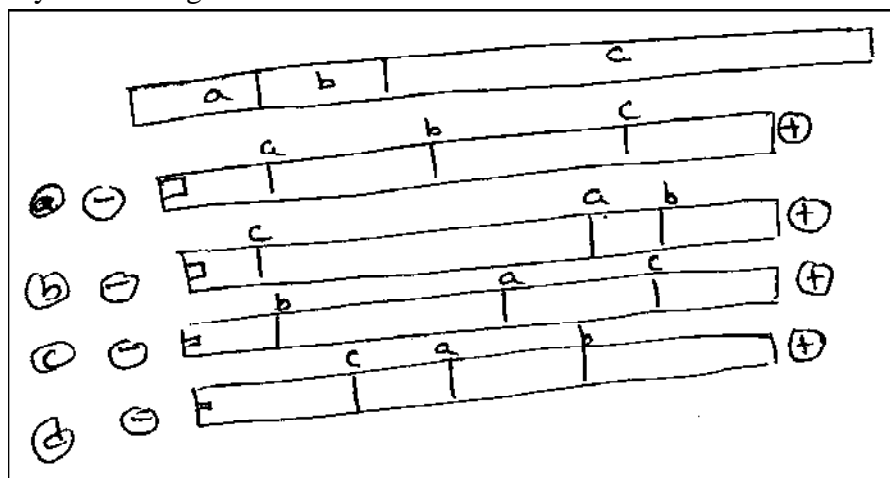


## Questionbank Biology

- (42) Genes which helps in the growth of transformants are .....
- (a) origin of replication                      (b) cloning site  
(c) origin of restriction                      (d) selectable marker
- (43) Ti Plasmid is a cloning vector which works with
- (a) All the plants                      (b) Dicots only  
(c) Monocots only                      (d) Thallophytes only
- (44) During which of the following techniques host cells are exposed to pulse of high voltage current ?
- (a) Electroporation                      (b) Particle Bombard ments  
(c) Micro injection                      (d) lipofection
- (45) Particle bombardment technique is also known as .....
- (a) Lipofection                      (b) Electroporation                      (c) Biolistic                      (d) Micro injection
- (46) Which enzyme is used to break the membrane to relase plant DNA ?
- (a) Lysozyme                      (b) Chitinase                      (c) Cellulose                      (d) All the above
- (47) Which enzyme is used to break the membrane to relase animal DNA ?
- (a) Lysozyme                      (b) chitinase                      (c) Cellulose                      (d) All the above
- (48) Which is the first step in the process recombinant DNA technology ?
- (a) denaturing of DNA                      (b) Annealing of DNA  
(c) Isolation of Donor DNA                      (d) Down streaming
- (49) Which primers are used in annealing during amplification of gene ?
- (a) Reverse primers                      (b) Forward primers  
(c) Oligo nucleotide primer                      (d) Internal primers
- (50) What is temperature required for annealing of DNA molecule ?
- (a) 50-65<sup>0</sup> C                      (b) 30-35<sup>0</sup> C  
(c) 40-45<sup>0</sup> C                      (d) 20-25<sup>0</sup> C
- (51) Which of the following is related with genetic engineering ?
- (a) Breeding                      (b) somatic hybridization  
(c) mutation                      (d) Transgenic
- (52) What is C - DNA ?
- (a) circular DNA  
(b) Cloned DNA  
(c) DNA produced from reverse transcription of RNA  
(d) Cytoplasmic DNA
- (53) Which of the bollowing statement is incorrect ?
- (a) cosmid contains gene coding for viral protein  
(b) cosmid relpicates like plasmids  
(c) cosmid has antibioticresistant marker gene  
(d) cos sit has 12 bases helping to join complete genome to make it circular

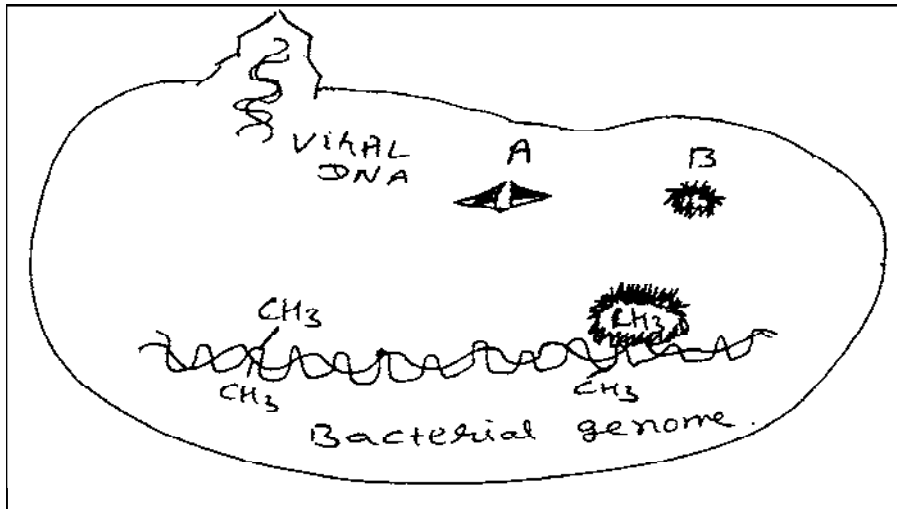
Questionbank Biology

- (54) The genetic recombinants obtained by insertion of plasmid into 1 phage genome is called  
 (a) cosmid (b) plasmid  
 (c) phagemid (d) foreign DNA
- (55) TATAATG sequence near the RNA start point of prokaryotic promoter is.....  
 (a) NICKS (b) DNA marker  
 (c) palindrome (d) Pribnow box
- (56) Exonucleases cleaving nucleotides one at a time from the end of polynucleotide chain are.  
 (a) Specific for 5' end of RNA strand (b) specific for 3' end of RNA strand  
 (c) specific for both 5' and 3' ends of nucleotide strand  
 (d) Non-specific for 5' and 3' ends of nucleotide
- (57) Genes that are involved in turning on or off the transcription of a set of structural genes are called  
 (a) Polymorphic genes (b) operator gene  
 (c) Redundant gene (d) Regulatory gene
- (58) This segment of DNA restriction sites I and II which create restriction fragments a, b and c which of the following gel (s) Produces by electrophoresis would represent the separation and identity of these fragments ?

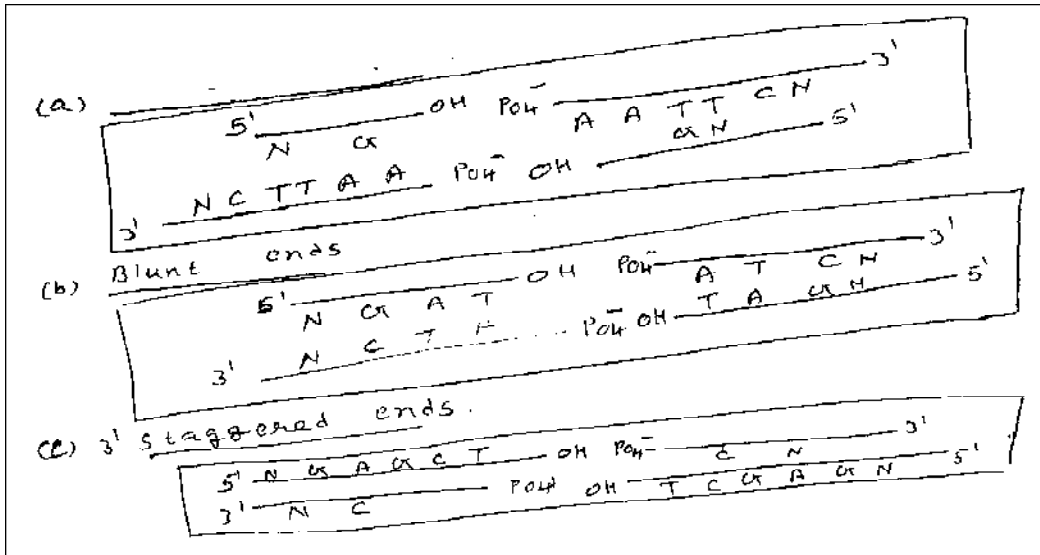


- (59) Enzymes used in PCR is ....  
 (a) taq polymerase  
 (b) gyrase  
 (c) transcriptase  
 (d) hexokinase
- (60) What are structure labelled A & B respectively  
 (a) EcoRv restriction endonuclease and EcoRv ligase  
 (b) EcoRv ligase and EcoRv nuclease and EcoRv methylase  
 (c) Eco—Rv restriction endo EcoRv methylase  
 (d) EcoRv Polymerase and EcoRv methylase

- (61) Can you pick up from the figure how bacteria protects its own genome from degradation by restriction endonuclease ?



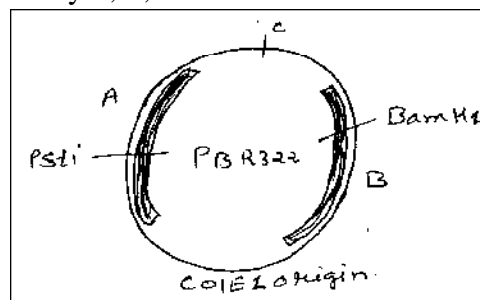
- (a) site specific coupling  
 (b) site specific oxidizing  
 (c) site specific oxidizing  
 (d) site specific methylases
- (62) EcorI, EcoRv and Sac I are types of restriction enzymes Three types of termini can be generated (1) 5<sup>1</sup> staggered and (2) Blunt ends (e) 3<sup>1</sup> staggered ends 5<sup>1</sup> termini of each strand in the cleavage product retain phosphory, group from the phosphodiester bond 3<sup>1</sup> termini are hydroxylated which of the following is correct answer ?



- (a) All of these produce sticky ends  
 (b) All of them produce blunt ends  
 (c) Each one of them can produce sticky and blunt ends  
 (d) All of them act on pallindromic sequences

(63) This is figure of plasmid pBR322 Identify what represented by A, B, and C

- (a) A TcR, B ApR and C EcorI
- (b) A TcR, B EcoRI and C ApR
- (c) A - EcorI, B ApR and C TcR
- (d) A ApR, B TcR and C EcoRz



### Matching type questions

(64) These are important set of enzymes used in biotechnology Match them with exact role

- |   |                           |   |
|---|---------------------------|---|
| P | Taq DNA Polymerase        | (i) cutting single stranded part of DNA |
| Q | S I nuclease              | (ii) Ligase                             |
| R | Restriction endo nuclease | (iii) Thermostable enzyme               |
| S | mole cular glue           | (iv) cutting pallindromic sequences     |
|   |                           | (v) union of pallindromic sequences     |

- |     | P     | Q    | R    | S    |
|-----|-------|------|------|------|
| (a) | (iii) | (iv) | (i)  | (ii) |
| (b) | (iii) | (v)  | (iv) | (ii) |
| (c) | (iv)  | (i)  | (v)  | (ii) |
| (d) | (iii) | (iv) | (i)  | (ii) |

(65) Match the column I and column II

- |   |                       |   |
|---|-----------------------|---|
| P | Radio active antibody | (a) substance that can be constructed in the laboratory   |
| Q | Artificial gene       | (b) substance that can be used to identify colonies of genetically engineered bacteria that makes particular gene product |
| R | Amplification         | (c) Abnormal enhanced replication of a plasmid many copies of plasmid in each cell  |
| S | To produce clones     | (d) A large population of idential cells  |
| T | short gun cloning     | (e) The use of entire array of genes of an organism in order to obtain particular gene product                            |

- |     | P | Q | R | S | T |
|-----|---|---|---|---|---|
| (a) | b | a | c | d | e |
| (b) | a | c | b | d | e |
| (c) | a | c | d | b | e |
| (d) | b | c | e | d | a |

**Assertoin- Reason type Questions**

A is assertion R is reasoning

- (a) A is correct, R is explanation of A  
 (b) A is correct, R is correct but it is not explanation of A  
 (c) A is correct , R is false.  
 (d) A is wrong , R is wrong  
 (e) A is wrong, R correct
- (66) A - Hybridoma cells are shifted to a medium deficient in nutrient which can not be synth sized by myeloma cells  
 R - This medium allows selection of hybridoma cells  
 (a) (b) (c) (d) (e)
- (67) A - The term hybridoma is applied to fused cells  
 R - They are formed by the fusion of lymphocyte cell and myeloma cell  
 (a) (b) (c) (d) (e)
- (68) A - Extraction and purficiation of enzymes is laborious and expensive  
 R - protein engineering can be used to produce enzymes at large scale  
 (a) (b) (c) (d) (e)
- (69) A - Restriction enzymes of different organisms that recognize the identical sequences a the called isoschizomers  
 R - They are present only in eukarytoes  
 (a) (b) (c) (d) (e)
- (70) A- Plasmids are tools of genetic engineering  
 R- Virulence plasmids provide pathogenecity to bacteria  
 (a) (b) (c) (d) (e)
- (71) For transformation, micro particles coated with DNA are bombarded with gene gun made up of.  
 (a) Platinum or Zinc (b) Silicon or Platinum  
 (c) Gold or tungsten (d) Silver or Platinum
- (72) PCR and Restriction fragment lenth Polymorphism are the methods for. (AIPMT-2012)  
 (a) genetic transtormation (b) DNA Sequencing  
 (c) DNA finger printing (d) Study of enzymes
- (73) The linking of antibiotic resistance gene with the plasmid Vector became possible with (CBSE-2008)  
 (a) DNA ligase (b) Exonuclease (c) Endo nuclease (e) DNA Polymerase
- (74) Gel electrophoresis is used for-- (CBSE-2008)  
 (a) Isolation of DNA molecule  
 (b) Cutting of DNA in to fragments  
 (c) Separation of DNA fragments according to their size  
 (d) Construction of recombinant DNA by joining with cloning Vector

Questionbank Biology

(75) Which one of the following Palindromic base sequence in DNA can be easily cut at about the middle by some Particular restriction enzyme? (CBSE-2010)

- (a) 5<sup>1</sup> \_\_\_\_\_ GATATG \_\_\_\_\_ 3<sup>1</sup>  
 3<sup>1</sup> \_\_\_\_\_ CTAATA \_\_\_\_\_ 5<sup>1</sup>
- (b) 5<sup>1</sup> \_\_\_\_\_ GAATTC \_\_\_\_\_ 3<sup>1</sup>  
 3<sup>1</sup> \_\_\_\_\_ CTTAAG \_\_\_\_\_ 5<sup>1</sup>
- (c) 5<sup>1</sup> \_\_\_\_\_ CACGTA \_\_\_\_\_ 3<sup>1</sup>  
 3<sup>1</sup> \_\_\_\_\_ CTCAGA \_\_\_\_\_ 5<sup>1</sup>
- (d) 5<sup>1</sup> \_\_\_\_\_ CGTTCG \_\_\_\_\_ 3<sup>1</sup>  
 3<sup>1</sup> \_\_\_\_\_ ATGGTA \_\_\_\_\_ 5<sup>1</sup>

(76) Genetic engineering has been successfully used for producing \_\_\_\_ (CBSE-2010)

- (a) transgenic models for studying new treatments for Certain cardiac diseases.  
 (b) transgenic Cow - Rosie which produces high fat milk for making ghee.  
 (c) animals like bullocks for farm work as they have super power.  
 (d) transgenic mice for testing safety of polio Vaccine before use in humans.

(77) Match the following and choose the correct combination from the option given ...

(Karnatak PMT-2005)

Column I

Column II

- |                                   |  |
|-----------------------------------|--|
| (a) <i>Escherichia coli</i>       | 1 - nif gene                               |
| (b) <i>Rhizobium meliloti</i>     | 2 - digestion of hydrocarbons of crude oil |
| (c) <i>Bacillus thuringiensis</i> | 3 - human insulin production               |
| (d) <i>Pseudomonas putida</i>     | 4 - Biocontrol of fungal disease           |

5 - biodegradable insecticide

- |                                |                                 |
|--------------------------------|---------------------------------|
| (a) A = 3, B = 1, C = 5, D = 4 | (b) A = 1, B = 2, C = 3, D = 4, |
| (c) A = 2, B = 1, C = 3, D = 4 | (d) A = 4, B = 3, C = 1, D = 2  |
| (e) A = 3, B = 1, C = 5, D = 2 |                                 |

(78) Find the incorrect statement

- (a) Gene therapy is a genetic engineering technique used to treat disease at molecular level by replacing defective genes with normal genes.  
 (b) Calcitonin is a medically useful recombinant product in the treatment of infertility  
 (c) Bt toxin is a Biodegradable insecticide obtained from bacillus thuringiensis  
 (d) Trichoderma sp. is a biocontrol agent for fungal diseases of plants  
 (e) Totipotency is the potential ability of a cell to develop into a complete plant

(Karnatak PMT-2005)

(79) Production of a human protein in bacteria genetic engineering is possible because

- (a) bacterial cell can carry out the RNA splicing reactions  
 (b) the human chromosome can replicate in bacterial cell  
 (c) the mechanism of gene regulation is identical in human and bacteria  
 (d) The genetic code is universal

(CBSE-2005)

Questionbank Biology

- (80-) The basis of DNA finger printing is  
(a) The double helix (b) Errors in base sequence  
(c) Poly morphism in sequence (d) DNA replication  
(e) DNA Coiling (Kerala - 2008)
- (81) A genetically engineered microorganism used successfully in biomediation of oil spill  
is species of (CBSE-2007)  
(a) Trichoderma (b) Xanthomonas (c) Bacillus (d) Pseudomonas
- (82) What is the function of Restriction endonuclease ? (AIPMT -2006)  
(a) Restricts the synthesis of DNA inside the nucleus  
(b) Synthesizes DNA  
(c) Cuts DNA molecule randomly  
(d) cuts DNA molecule at specific sites
- (83) The nuclease enzyme which begins its attack from Free end of a polynucleotide is  
(Pb-PMT-2001)  
(a) Exonuclease (b) Kinase (c) Polymerase (d) Endonuclease
- (84) Identify the Plasmid (ET 2004)  
(a) Alu I (b) Hind III (c) ECORI (d) P<sup>BR322</sup>
- (85) Molecular scissors, which cut DNA at specific site (Kerala-2004)  
(a) ligase (b) cellulase (c) pectinase (d) Polymerase  
(e) restriction endonuclease
- (86) In transgenics the expression of transgene in the target tissue is known by (CBSE-2004)  
(a) Enhancer (b) Transgene (c) Promoter (d) Reporter
- (87) Variable number of tandem repeats (VNTR) in the DNA molecule are highly useful  
in  
(a) monoclonal antibody production (b) DNA finger printing  
(c) Recombinant DNA technology (d) stem cell culture (K.C.E.T - 2006)
- (88) Which one of the following bacteria has found extensive use in genetic engineering  
work in plants ?  
(a) Agrobacterium tumefaciens (b) Clostridium septicum  
(c) Xanthomonas citri (d) Bacillus Coagulans  
(CBSE - 2003)
- (89) What does Bt stand For the Popular crop Bt Cotton ?  
(a) Best (b) Best type (c) Biotechnology (d) Bacillus tomentosa
- (90) The total number of nitrogenous bases in human genome is estimated to be about  
(a) 35 million (b) 3.1 million (c) 3.5 million (d) 3.5 thousand (AIIMS 2004)
- (91) Name of the drug used in cancer treatment produced by using biotechnology is .....
- (a) HGH (b) TSH (c) Insulin (d) Interferon



(Kerala PMT 2004)

- (92) Which of the following pair is correctly matched ?  
 (a) - central dogma - codon  
 (b) - Okazaki fragments - splicing  
 (c) RNA Polymerase - RNA Primer  
 (d) Restriction enzymes - genetic engineering (JIPMER - 2004)
- (93) First Biochemical to be Produced commercially by microbial cloning and genetic engineering is \_\_\_\_ (BHU-2005)  
 (a) interferon                      (b) penicillin  
 (c) human insulin                (d) Fertility factors
- (94) First hormone prepared by genetic engineering is .... (Manipal-2005)  
 (a) Insulin                          (b) Oxytocin  
 (c) adrenaline                      (d) Somatotropin
- (95) A technology which has found immense use in solving cases of disputed parentage is (Karnataka ET-2005)  
 (a) DNA finger printing                      (b) Polymerase chain reaction  
 (c) Recombinant DNA technology                      (d) Monoclonal antibody production
- (96) Matching sequence of DNA between two evidences, one of the criminal with the suspect is known as (AMU-2005)  
 (a) DNA finger printing                      (b) DNA amplification  
 (c) Gene mapping                      (d) DNA resolution
- (97) Given below is a sample of a portion of DNA strand giving the base sequence on the opposite strands, what is so special shown in it ?  
     5<sup>1</sup> \_\_\_\_\_ GAATTC \_\_\_\_\_ 3<sup>1</sup>  
     3<sup>1</sup> \_\_\_\_\_ CTTAAG \_\_\_\_\_ 5<sup>1</sup>  
 (a) Replication Completed  
 (b) Deletion mutation  
 (c) start codon at 5<sup>1</sup> end  
 (d) Palindromic sequence of base pairs
- (98) Agarose extracted From weeds finds use in \_\_\_\_\_ (A.I.PMT 2011)  
 (a) spectrophotometry                      (b) Tissue culture  
 (c) Gel electrophoresis                      (d) PCR
- (99) Widely used tool in genetic engineering of crop plants is \_\_\_\_ (AIEEE 2004)  
 (a) protoplast fusion                      (b) Transposon  
 (c) Micro injection                      (d) Agrobacterium mediation
- (100) c DNA Probes are copied from messenger RNA molecule with the help of \_\_\_\_  
 (a) Restriction enzyme                      (b) Reverse transcriptase  
 (c) DNA Polymerase                      (d) Adenosine deaminase

(AIIMS 2005)

- (101) Which one of the following pair is wrongly matched ?  
 (a) methanogens - Gobargas                      (b) Yeast - Ethanol  
 (c) Streptomycetes - Antibiotic              (d) Coliborms - vinegar  
(CBSEPMT-2007)
- (102) The Prerequisites for biotechnological production of antibiotic is  
 (a) to search an antibiotic producing microorganism  
 (b) to isolate the antibiotic gene  
 (c) to join antibiotic gene with E coli plasmid  
 (d) All of the above  
(MP PMT 2008)
- (103) Which one of the following is now being commercially produced by biotechnological Procedures  
 (a) Nicotine              (b) Morphine              (c) quinine              (d) Insulin
- (104) Which one of the following is a wrong matching of a microbe and its industrial product while the remaining three are correct  
 (a) clostridium butylicum - lactic acid  
 (b) Aspergillis niger cirric acid  
 (c) yeast - statins  
 (d) Acetobacter aceti - acetic acid  
(CBSE PMT 2011)
- (105) Some of the steps involved in the production of humulin are given below choose the correct sequence  
 (i) synthesis of gene (DNA) for human insulin antibiically  
 (ii) culturing recombinant E.Coli in bioreactors  
 (iii) Purification of humulin  
 (iv) Insertion of human insulin gene into plasmid  
 (v) Introduction of recombinant Plasmid into E.Coli  
 (vi) Extraction of recombinant gene product From E.Coli  
 (a) (ii), (i), (iv), (iii) (v), (vi)                      (b) (i), (iii), (v), (vi), (ii), (iv)  
 (c) (i), (iv), (v), (ii), (vi), (iii)                      (d) (iii), (v), (ii), (i), (vi), (iv)  
(KCET -2010)

**ANSWER KEY**

1	d	36	c	71	c
2	a	37	b	72	d
3	c	38	b	73	c
4	d	39	c	74	c
5	b	40	b	75	b
6	b	41	b	76	d
7	d	42	a	77	c
8	b	43	b	78	a
9	b	44	a	79	c
10	d	45	b	80	d
11	a	46	a	81	c
12	d	47	b	82	d
13	c	48	a	83	a
14	a	49	a	84	c
15	d	50	a	85	e
16	b	51	d	86	a
17	b	52	c	87	b
18	c	53	a	88	a
19	a	54	a	89	e
20	c	55	d	90	d
21	b	56	b	91	c
22	a	57	c	92	c
23	b	58	b	93	a
24	a	59	c	94	a
25	a	60	a	95	a
26	c	61	d	96	d
27	b	62	b	97	c
28	c	63	d	98	b
29	a	64	c	99	b
30	b	65	a	100	d
31	b	66	a	101	d
32	a	67	c	102	d
33	d	68	d	103	d
34	c	69	a	104	a
35	c	70	b	105	b



## Unit-IX

### Chapter-12. Biotechnology & its applications

#### IMPORTANT POINTS

- Biotechnology is a field of applied biology that involves the use of living organisms and bioprocessors in engineering, technology, medicine and other fields requiring bioproducts. A genetically modified organism (GMO) is an organism whose genetic material has been altered using genetic engineering technique. GM plants are pest resistance, herbicide tolerance, disease resistance, cold, drought, salt and heat tolerance and with enhanced nutritional value of food eg. Vitamin A enriched rice.
- Importing the property of pest resistance through the transfer of gene from *Bacillus thuringiensis* (Bt) into target plant through modern biotech method is presently considered to be one of the most advanced application of biotechnology.
- The field of biotechnology has introduced techniques like gene therapy; recombinant DNA technology and polymerase chain reaction which use genes and DNA molecules to diagnose diseases and insert new and healthy genes in the body which replace the damages gene or DNA. Gene therapy may be defined in broad general terms as “introduction of normal functional gene into cells; in order to replace defective or mutated gene.”
- Gene therapy may be classified into (1) germline therapy and (2) somatic cell gene therapy.
- Transgenesis refers to the phenomenon of introduction of exogenous DNA into the genome of an animal to create and maintain a stable heritable character. The foreign DNA is introduced is called transgene. And the animal whose genome is altered by adding one or more transgenes is said to be transgenic animal.
- Bioethics may be viewed as a set of standards that may be used to regulate our activities in relation to the biological world.
- A patent is the right granted by the government to prevent others from commercial use of researcher’s invention. Patents for bioscientific researches are called biopatents.
- When big organizations and multinational companies exploit patent biological resources or bioresources of other nations without proper authorization from the countries concern; such exploitation is called biopiracy. While Biosafety is the presentation of large scale loss of biological integrity, focusing both on ecology and human health.

1. In which of the following industrial areas biotechnology is applicable?
 

(a) Health care	(b) Environment
(c) Agriculture	(d) all of the above
2. Due to what food supply has increased during green revolution?
 

(a) use of chemicals	(b) use of biochemicals
(c) use of photochemicals	(d) use of agrochemicals
3. The organizations whose genetic material has been altered using genetic engineering is called as -
 

(a) Genetically mutant organism	(b) Genetically modern organism
(c) Genetically modified organism	(d) Genetically transferred organism.

4. Full form of GMO is -
  - (a) Genetically mutant organism
  - (b) Genetically modern organism
  - (c) Genetically modified organism
  - (d) Genetically transferred organism
5. Which of the following is responsible for causing disease in plants?
  - (a) virus
  - (b) pesticide
  - (c) Herbicide
  - (d) all the above
6. Bt stands for -
  - (a) Biotechnology
  - (b) Bacteria tolerant
  - (c) Bacillus thuringiensis
  - (d) Bollworm toxin
7. Where from Bt toxin gene has been obtained?
  - (a) plants
  - (b) virus
  - (c) Bacteria
  - (d) Fungi
8. In which of the following plant Bt toxin gene is expressed?
  - (a) Bt cotton
  - (b) Bt corn
  - (c) Bt Brinjal
  - (d) All the above
9. Toxin proteins produced by the bacterial gene destroys -
  - (a) Aphids
  - (b) grass hoppers
  - (c) Boll worms
  - (d) Beetles
10. The toxin produced by the Bt is coded by a gene named as -
  - (a) Cry
  - (b) Cry Protein
  - (c) Cyr
  - (d) Cyr Protein
11. Which of the following techniques use genes and DNA molecules for diagnoses of diseases?
  - (a) Gene therapy
  - (b) Recombinant gene technology
  - (c) Polymerase chain reaction
  - (d) All the above
12. What were the earlier sources of Insulin?
  - (a) cattle and pig
  - (b) camel and pig
  - (c) cattle and dog
  - (d) goat and pig
13. Which technology was used to produce human Insulin in E. coli ?
  - (a) Gene therapy
  - (b) Recombinant gene technology
  - (c) Polymerase chain reaction
  - (d) All the above
14. Which therapy is used for modification of germ cells (sperms and eggs)?
  - (a) sperm line therapy
  - (b) Germ line therapy
  - (c) Egg line therapy
  - (d) Germ line gene therapy
15. Modifications by germ line gene therapy are heritable as -
  - (a) The Functional gene is incorporated into to their genome.
  - (b) The Functional gene is incorporated into one of the gene.
  - (c) The Functional gene is incorporated into somatic cells.
  - (d) All the above

16. In which therapy, vectors are used to introduce desired gene into the body of patients?
 

(a) In vivo, gene therapy	(b) Germ line therapy
(c) Ex vivo gene therapy	(d) Foreign gene therapy
17. The method during which genetic characteristics of animals are improved by mating of selected breeds is known as -
 

(a) Improved breeding	(b) selective breeding
(c) mating	(d) Breeding
18. The Phenomenon of introduction of exogenous DNA into the genome of animals is -
 

(a) In vivo, gene therapy	(b) Foreign gene therapy
(c) Ex vivo gene therapy	(d) Transgenesis
19. The animals whose genome is altered by introduction of transgene is known as -
 

(a) modified animals	(b) Hybrid animals
(c) cross breed animals	(d) Transgenic animal
20. Transgene introduced in the first transgenic cow was responsible for the production of
 

(a) Albumin enriched milk	(b) Protein enriched milk
(c) Human protein enriched milk	(d) Vitamins enriched milk
21. What was the amount of Alpha-lactalbumin in the milk of transgenic cow ?
 

(a) 4.2 grams per litre	(b) 2.4 grams per litre
(c) 3.4 grams per litre	(d) 4.2 grams per litre
22. Earlier which animals were used to test the safety of Polio Vaccine
 

(a) Transgenic rat	(b) Transgenic pigs
(c) Transgenic mice	(d) Transgenic sheep
23. The right granted by government to prevent others from the commercial use of resources invention is -
 

(a) Government grant	(b) Patent
(c) official document	(d) Biopatent
24. Exploitation of Patent of biological resources of other nations is called as -
 

(a) Biosafety	(b) Biopiracy	(c) Biowar	(d) Bioabuse
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25. Organisms which can be used to gain commercial benefits are called -
 

(a) Beneficial resources	(b) Bioresources
(c) Financial resources	(d) Biological resources
26. The plant *Pentadiplandra brazzeana* belongs to which country ?
 

(a) China	(b) West Africa	(c) Pakistan	(d) America
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27. Which technology facilitates the production of novel DNA molecule by combining sequences from DNA from two different organisms ?  
 (a) gene therapy (b) Recombinant DNA technology  
 (c) Polymerase chain reaction (d) germ line gene therapy
28. Which is the most common bioinsecticide for the protection of cotton ?  
 (a) Pyrethrin (b) Rotenone (c) Eicer (d) Bacillus thuringiensis
29. Which of the following can be controlled with the help of biopesticides ?  
 (a) Insects (b) Diseases (c) Weeds (d) All the above
30. Transgenic animals are produced by incorporation of Foreign gene into the -  
 (a) Nucleus of fertilized egg (b) Nucleus of sperm  
 (c) Nucleus of unfertilized egg (d) Egg cell
31. The bacteria associated with plant genetic engineering are -  
 (a) salmonella and Pseudomonas  
 (b) Salmonella typhimurium and agrobacterium  
 (c) Bacillus thuringiensis and Pseudomonas fluorescens  
 (d) Both b and c
32. The science of biotechnology has contributed to field of  
 (a) Health (b) Pharmacy  
 (c) agriculture and industry (d) all above
33. The method of producing proteins for food or feed through microbial biomass is called  
 (a) PCR (b) SCP (c) Nanotechnology (d) None of above
34. The insulin prepared through genetic engineering is called  
 (a) Human insulin (b) microbial insulin  
 (c) Bio insulin (d) Humulin
35. The most common Bioinsecticide in present in the world for protection and mustard is——  
 (a) Pyrethrin (b) Bt. , (c) Rotenone (d) none of these
36. First progress in field of genetic engineering, in 1978 by Cohen, Berg and Boyer by synthesis of——  
 ——through E. coli  
 (a) Insulin (b) growth hormone (c) Somatostatin (d) both b and c
37. Which was the first product contributed to human kind by science of Biotechnology in early 1972  
 (a) somatotropin (b) Insulin (c) cytokines (d) erythropoietin
38. Which is the most common Plasmid used for most of genetically engineered product ?  
 (a) PBR322 (b) R Plasmid types (c) CaMV195 (d) both a and b

39. The main use of recombinant DNA technology are.....
- (a) production of transgenic humans.
  - (b) the creation of cells capable of synthesizing economically important molecules.
  - (c) the efficient reduction of useful proteins.
  - (d) both b and c
40. Biofuel is made by utilizing which strain of bacteria ?
- (a) *Bacillus amyloliquefaciens*
  - (b) *Klebsiella Planticola*
  - (c) *E. coli*
  - (d) *Phanerochaete chrysosporium*
41. Bio augmentation is .....
- (a) the addition of commercially prepared bacterial strain
  - (b) Production of fertilizers by using bacteria
  - (c) the metals are deposited as insoluble oxides and sulphides by activities of bacteria
  - (d) removal of pests
42. Which of the following animal is best known genetically ?
- (a) Planaria
  - (b) Domestic dog
  - (c) *Musca domestica*
  - (d) *Drosophila melanogaster*
43. Which one is a transgenic crop ?
- (a) Brinjal
  - (b) Potato
  - (c) Grape
  - (d) Tomato
44. First transgenic mouse grew twice the normal size after drinking \_\_\_\_\_ containing water.
- (a) Cu
  - (b) Fe
  - (c) Zn
  - (d) Ra
45. The genetically modified crops introduced in India are ...
- (a) cotton
  - (b) mustard
  - (c) Wild plant
  - (d) Both a and b
46. One of the following is the correct sequence to make a transgenic animals.
- (a) Transomics – transfection – micro infection – electro portion – retroviral vectors
  - (b) Micro injection - transfection - electro portion - retroviral vectors - transomics
  - (c) Transfection – micro injection - transomics - electro portion - retroviral vectors
  - (d) None of these
47. one of the following is transgenic organisms
- (a) Holly sheep and tomato
  - (b) Dolly sheep and subabul
  - (c) Molly sheep and banana
  - (d) B T cotton and tomato (Flaur saur)
48. Transgenic plants are produced by using Ti Plasmids from the
- (a) *Agrobacterium tumefaciens*
  - (b) *E. coli*
  - (c) Bacteriophage
  - (d) *Agrobacterium varians*



49. Vaccine is a .....
- (a) collection of antibiotics  
 (b) collection of life saving drugs  
 (c) collection of killed disease causing bacteria and virus  
 (d) collection of lysins
50. The typical machine for production of bio-products through microbial is
- (a) sterilized glass ware (b) microprojectile  
 (c) autoclave (d) Fermenter
51. The foods made from genetically modified crops required to Pass human testing because
- (a) they may cause allergies (b) they may alter genes  
 (c) they may cause mutations and release toxins (d) all above
52. There are set of health care products. Match them with organisms which are genetically engineered for respective products.
- |                 |                                     |  |
|-----------------|-------------------------------------|--|
| A. Insulin      | 1. Escherichia coli / saccharomyces |  |
| B. Somatotropin | 2. Escherichia coli / yeast         |  |
| C. Interferon   | 3. G M E coli                       |  |
| D. Interleukins | 4. hGH in E. coli                   |  |
|                 | 5. Humulin through E. coli          |  |
- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 5 | 4 | 1 | 2 |
| (b) | 5 | 1 | 1 | 4 |
| (c) | 5 | 3 | 4 | 1 |
| (d) | 5 | 4 | 3 | 2 |
53. Pick up the correct set.
- |                       |  |  |
|-----------------------|--|--|
| A. Spirulina          | 1. Non surfacetant polymers for oil recovery |  |
| B. Monilia / Fusarium | 2. SCP                                       |  |
| C. Methanobrevibacter | 3. Ethanol from carbohydrates                |  |
| D. Aureobasidium      | 4. Curd formation                            |  |
|                       | 5. Biogas formation                          |  |
- |     | A | B | C | D |
|-----|---|---|---|---|
| (a) | 2 | 3 | 5 | 1 |
| (b) | 2 | 5 | 4 | 1 |
| (c) | 2 | 4 | 3 | 5 |
| (d) | 2 | 1 | 4 | 5 |

**Assertion – reason type of Questions**

- (a) Both A & R true. R is explanation of A  
 (b) Both A & R true but R is explanation of A  
 (c) A is wrong R is true.  
 (d) A is wrong R is wrong.  
 (e) A is right R is wrong.
54. A – some bacteria produce vit. B<sub>12</sub>  
 R – vitamins are obtained when they are alive  
 (a) (b) (c) (d)
55. A – second generation vaccines are safer to use.  
 R – They are produced by genetic engineering.  
 (a) (b) (c) (d)
56. A – Vitamin B<sub>2</sub> is found in cereals, green vegetables, brewer's yeast, milk and liver.  
 R – It can be commercially produced by some yeast.  
 (a) (b) (c) (d)
57. Tissue culture technique has been biotechnologically successful in production of -  
 (a) alcoholic beverages (b) cheese (c) shikonin (d) Insulin
58. Yeast is a good source of  
 (a) carbohydrates (b) vitamin B (c) Proteins (d) both b and c
59. The micro – organism involves in making bread is .....  
 (a) Acetobacter (b) brewer's yeast  
 (c) Saccharomyces cerevisiae (d) None of the above
60. Penicillin is obtained from -  
 (a) Mushroom (b) viruses (c) Bacteria and viruses (d) Penicillium notatum
61. A bioreactor refers to  
 (a) Fermentation tank (b) organisms reacting to stimuli  
 (c) Nuclear reactor for biochemical reactions (d) Tank & biochemical reactions
62. Cells obtained from cancerous tumours are known as -  
 (a) myelomas (b) hybridomas (c) Lymphocytes (d) Monoclonal cells
63. Hybridomas are employed for  
 (a) synthesis of antibiotics (b) Killing cancer cells  
 (c) synthesis of monoclonal antibodies (d) Production of somatic hybrids
64. Antibiotics inhibits the growth or destroy  
 (a) Bacteria and fungi (b) Bacteria and viruses  
 (c) Bacteria algae and viruses (d) Bacteria, fungi and viruses



## Unit-X

### Chapter-13. Organism and population

#### IMPORTANT POINTS

- Ecology : The study of organism where they live
- Ecology is divided in many branches, population ecology is one of them
- Environment : Study of our surrounding factors and their interaction
- Organisms where they live is known as habitat
- They live in fresh water ponds, sea, estuarine region and on land. Each habitat has its own characteristics.
- Population : Group of organisms of same species living in same habitat at a species period.
- Different organisms of a population interacts differently. It may be interspecific
- It consists of species, variations, constituents and succession.
- Biotic community is affected by biotic and abiotic factors.
- characteristics of population : Density, mortality, age distribution, population equilibrium, population interaction.
- Organism interacts with other organism in different ways (1) mutualism (2) competition (3) predation (4) commensalism

1. What is true for the following statements ?

Statement X : Migration of birds is influenced by light.

Statement Y : Reproduction of birds is influenced by light.

Statement Z : In all birds gonads are activated due to increase in intensity of light during summer.

- |     | X     | Y     | Z     |
|-----|-------|-------|-------|
| (a) | True  | False | False |
| (b) | False | True  | False |
| (c) | True  | True  | True  |
| (d) | True  | True  | False |

2. What is true for the given statements ?

Statement X : Birds and Mammals obtain greater body size in cold region than in warm regions.

Statement Y : Birds and Mammals are Homeothermic (warm blooded) animals.

Statement Z : Reptiles are smaller in cold region.

- |     |      |       |       |
|-----|------|-------|-------|
| (a) | True | False | True  |
| (b) | True | True  | False |



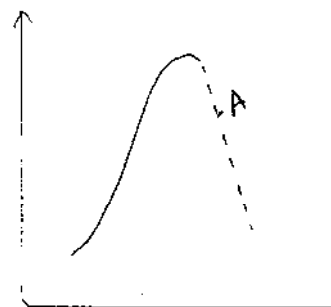
**Graph**

10. Crustacian Astacus = Green land  
Marine turtle  
what is 'X' according to the information given ?  
(a) Salt gland                      (b) Kidney  
(c) None of these                  (d) chlorine secretory cells
11. Which of the following is correct statement ?  
(a) uromatrix lizard stores water in the intestine  
(b) Camel stores water in its stomach  
(c) Anabrus develops accessory respiratory organs to respire in water.  
(d) Kangaroo rat undergoes hibernation.
12. Parasitic animal which is part of bio-geo community and included as zoo planktons and mesofauna of terrestrial ecosystem is ....  
(a) Moles                      (b) mites                      (c) Earthworms                      (d) leech
13. From the given option which is the appropriate for ecto parasite animal Ascaris, Tapeworm, Plasmodium, mites  
(a) phytoplanktons              (b) mesofauna  
(c) macrofauna                  (d) phytoplanktons and mesofauna.
14. Which living organism is seen in the hot water spring having temperature more than 100°C ..  
(a) Methanogens                  (b) Thermoacidophiles  
(c) Halophytes                      (d) spirochetes
15. Find out population density.  
Since last 4 years number of lions in a square forest is 500 (length of forest = 10 km)  
(a) 1.25 lions/year . k meter<sup>2</sup>              (b) 12.5 lions/ k meter<sup>2</sup> - year  
(c) 1.025 lions/ cm<sup>2</sup> month                  (d) 12.5 lions/ k meter<sup>2</sup> - month
16. Average human population in a certain time area is 5000 in which 1111 children are produced during an year, find out the birth rate ?  
(a) 0.1111                      (b) 0.3333                      (c) 0.2222                      (d) 0.4444
17. In birthrate and deathrate is equal, then what will be the Vital Index ?  
(a) = 1                      (b) = 100                      (c) >100                      (d) <100
18. Which option is correct for the given statement .  
Statement X : Density dependent factors are intrinsic Reason R : They are generated in population only  
(a) Both statements are true  
(b) Both statements are false  
(c) X is true, Y is false  
(d) X is false, Y is true

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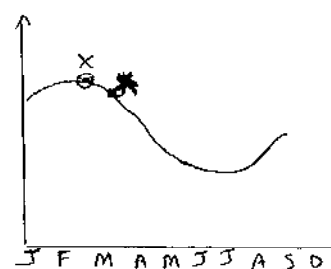
19. In a population of frog 'J' type of population growth curve is seen than which information from the given graph can be true for "point A"

- (i) Vital Index < 100
- (ii) Birth rate < death rate
- (iii) Birth rate > death rate
- (a) I
- (b) II, III
- (c) I, III
- (d) I, II



20. The given graph shows seasonal changes in the population of Birds of Gujarat in the year 2002. In the given graph what is true for point X ?

- (a) Vital Index < 100
- (b) Vital Index > 100
- (c) Vital Index = 100
- (d) None of these

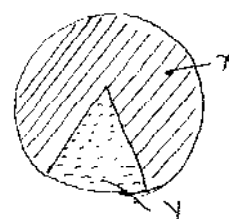


21. Producers ---->Decomposers ---->'X', then what will be 'X' ?

- (a) Nostoc
- (b) Fungi
- (c) Both of these
- (d) None of these

22. In given chart, what is the problem seen in living organism staying in 'X' denoted area ?

- (a) endosmosis
- (b) exosmosis
- (c) a & b both
- (d) getting water and maintaining it.



23. What is correct for the given statement ?

Statement P : Environmental study is linked with ecology

Statement Q : Ecology is included in environmental study.

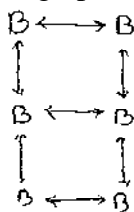
- (a) Both statement are true
- (b) Both statement are wrong
- (c) P is right and Q is wrong
- (d) P is wrong and Q is right

24. What is the vital Index, if Birth rate is 0 and Death rate = 5 ?

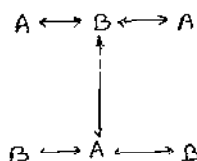
- (a) 0
- (b) 100
- (c) 1
- (d) None of these

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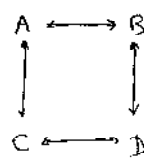
25. If the Birth rate is 10 and death rate is 0 then what is VITAL INDEX ?  
 (a) 0      (b) 100      (c)  $\alpha$  Infnative      (d) 1
26. Which is appropriate for the following statement ?  
 Statement X : Pacific salmon fish reproduces only once in its life time.  
 Statement Y : In a reproductive season it lays 2,80,000,000 eggs.  
 X                  Y  
 (a) True      True  
 (b) False      False  
 (c) True      False  
 (d) False      True
27. Mycobiont Supplies X to phycobiont and phycobiont supplies Y to mycobiont, then what is true for X and Y ?  
 (a) X : Mineral element ; Y : Habitat  
 (b) X : organic nutrients ; Y : Inorganic Nutrient  
 (c) X : Habitat                  Y : protection  
 (d) X : Minerals                  Y : organic nutrients
28. A plant formed by the combination of algae and fungi is a pioneer of which type of succession ?  
 (a) Xerosere      (b) Hydrosere      (c) Mesosere      (d) None of these
29.  $Y \leftrightarrow X$  having interspecific relations in which animal which is not affected is X shows excretory orgndds which are also seen in Y and is Z located in its gills then.... what are X,Y,Z - ?  
 (a) X = Termite                  (b) X = shank  
     Y = flagelates                  Y = Tortoise  
     Z = Tentacles                  Z = Chlorine cell  
 (c) X = shank                  (d) All of these (above)  
     Y = fish  
     Z = chlorine secreting cells
30. what does the given graph shows



(i)



(ii)



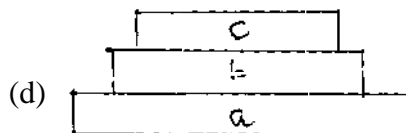
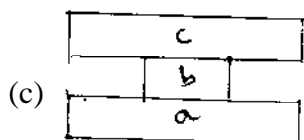
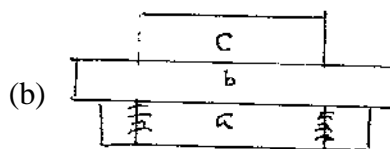
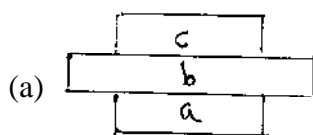
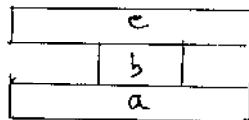
(iii)

- (a) (i) Community Ecology                  (b) (i) Population Ecology  
 (ii) Population Ecology                  (ii) Community Ecology  
 (iii) Population Ecology                  (iii) Ecosystem Ecology
- (c) (i) Population Ecology                  (d) None of these  
 (ii) Community Ecology  
 (iii) Community Ecology



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31. In a population of salmon fish, potential Natality is 10,000 while realised mortality is 200, then the Vital Index =  
 (a) 50, (b) less than 50 (c) more than 50 (d) None of these
32. Which of the following is not possible in ecosystem where microflora is absent  
 (a) Photosynthesis (b) Decomposition (c) Assimilation (d) None of these
33. If marine fish is kept in fresh water, will it survive  
 (a) Yes, If chlorine cells are placed in its kidney  
 (b) Yes, If chlorine cells are placed in its green gland  
 (c) No, Because it can not adapt  
 (d) No, they can not survive but of young ones hatching out of their eggs can survive
34. What is true for both the organism showing interspecific competition ?  
 (a) Both are benefited  
 (b) more or less harmful effect to both  
 (c) one is benefited where as other is at loss  
 (d) None of these
35. If at "t" time population density is N, then what is the equation for the population density at (t+1) time ?  
 (a)  $N(t+1) = Nt - [CD+E] - [B+I]$   
 (b)  $N(t+1) = Nt+B+I-D-E$   
 (c)  $N(t+1) = Nt+(B+I)-(D+E)$   
 (d) All of these
36. Write appropriate option for antibiosis  
 (a) Penicillium fungi and certain gram +ve bacteria  
 (b) Penicillium fungi and certain gram -ve bacteria  
 (c) Spirocheate and fermicutes  
 (d) None of these
37. The graph of age related distribution in a village is as following If during 1 year potential mortality = realized mortality, then which type of graph is seen after 1 year ?







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50. Increase and decrease in a population in one of the places in USA, because of sandy cyclone is given below.

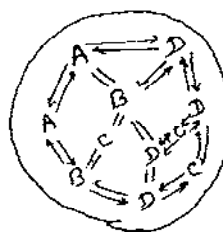
Which type of graph is possible for total no. of individuals in a population v/s month ?

Month	Birth rate	Imigration	Death	Emigration
July	40	100	30	20
August	100	200	50	45
September	200	800	100	10
October	100	--	5000	3000

- (a) S. Shaped (c) irrupative  
 (b) J. Shaped (d) None of these
51. Hygroscopic skin is seen in.....  
 (a) Kangaroo rat (b) Uromatrix  
 (c) Spiny tailed lizard (d) Camel
52. What is true for marine animals ?  
 (a) Because of exosmosis they drink sea water  
 (b) As they drink sea water exosmosis occurs  
 (c) Because of exosmosis body fluid become hypotonic, so they drink sea water  
 (d) None of these
53. In order to find out VITAL INDEX in Rampur Village, following information was gathered  
 Death Rate =  $1/x$  Birth Rate =  $z$   
 Average population =  $1/y$   
 What is the Vital Index ?  
 (a)  $xyz \times 100$  (b)  $z/xy = 100$   
 (c)  $xy/z \times 100$  (d)  $100/xyz$

54. What is the true for the community ecology diagram ?

- (a) Involvement of 4 individuls of a population  
 (b) Involvement of 4 population of a species  
 (c) Involvement of 4 species of a community  
 (d) Involvement of 4 speces of 4 ecosystem

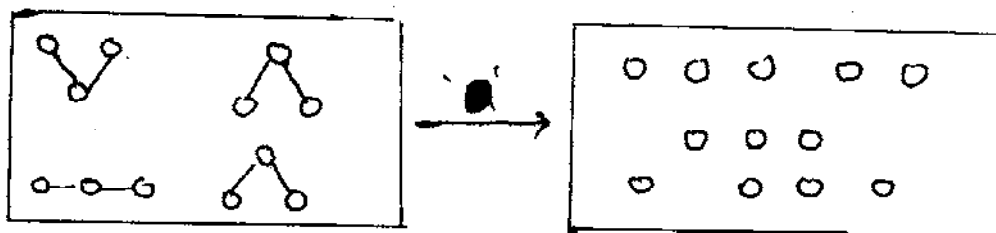


55. Match the column I with column II

- | Column I          | Column II                      |
|-------------------|--------------------------------|
| (1) Astacus       | (p) Hydrophiic skin            |
| (2) Marine turtle | (q) green gland                |
| (3) Spiny lizard  | (r) water storage in intestine |
| (4) Uromatrix     | (s) salt glands                |
- (a) (1-q), (2-s), (3-p) (4-r) (b) (1-s), (2-q), (3-p) (4-r)  
 (c) (1-s), (2-p), (3-q) (4-r) (d) (1-p), (2-q), (3-s) (4-r)

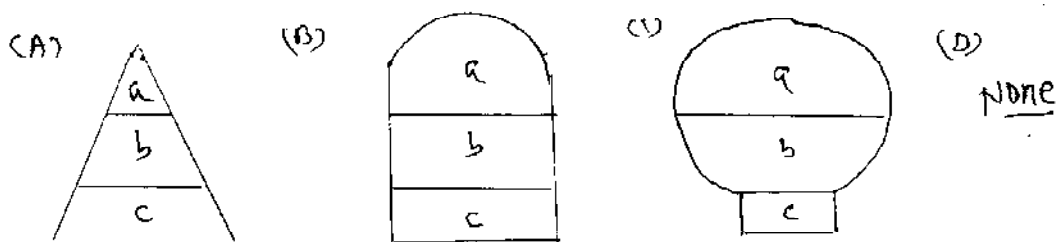
## Questionbank Biology

56. Which of the following is incorrect if 'O' sign is used for beneficial and '+' sign for harmful ?
- Penicillium <--> Gram +ve bacteria ; Penicillium: '+'
  - Rhizobium <---> palnt - leguminosae family : Both 'O'
  - Tiger <--> Rabbit ; Tiger : 'O'
  - Shank fish <---> Suckerfish ; Suckerfish ; 'O'
57. What will happen if 'X' which is related to this reaction is absent ?



- Deconposition, essential process like death, will stop
  - Damage to ecosystem
  - Begining of the food chain is not possible
  - All the statements given are correct
58. In the section of lichen which layer is seen just below "upper cortex"
- Medulla
  - Algal layer
  - lowercortex
  - All of these
59. What is true for the given statements ?
- Statement X : Protopterus aestivate during winter to overcome dry period    Statement Y : The process of aestivation in protopterus is to overcome unfavourable condition
- Both statements are true
  - X-Correct    Y- wrong
  - Both statements are wrong
  - X- wrong    Y- correct
60. What is true for the given statement ?
- Statement X : Most of the animals and almost all the plants cannot keep up their internal enviornment constant
- Statement Y : process of osmoregulation in plants is an example of this
- Both statements are true
  - X - correct,    Y- wrong
  - Both statements are wrong
  - X- wrong,    Y- correct

61. which type of pyramid is true for the population having more number of pre reproductive and re productive age group ?



a = post reproductive age group  
 b = reproductive age group  
 c = pre reproductive age group

62. X= Arthropods, Y = Mollusca, z = Coelenterates :-If the X by using Y, lives beneficial life with z, then which of the following is correct example ?

- (a) X = cockroach Y = pearl oyester Z = Hydra
- (b) X = Millipede Y = pila Z = jellyfish
- (c) X = Hermit crab Y = Gastropoda Z = sea anenone
- (d) All of these

63. From the given option find out the correct pair ?

- (a) Mesofauna - Earthworm
- (b) Macrofauna - spider
- (c) Microfauna - fungi
- (d) None of these

64. Match column I with column II

**Column - I**

- 1. Mutualism
- 2. Competition
- 3. Predation
- 4. Parasitism

**Column - II**

- (p) Barnacles
- (q) Tiger
- (r) Mites
- (s) Sea anemone

- (a) (1-s), (2-r), (3-p) (4-q)      (b) (1-r), (2-s), (3-q) (4-p)
- (c) (1-s), (2-p), (3-q) (4-r)      (d) (1-q), (2-r), (3-s) (4-p)

65. Give correct option for the given true and false statements

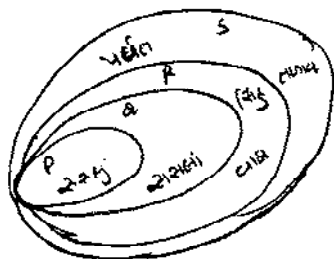
- (i) Some insects, birds and mammals living in warm and dry climate have more darker black pigments than the races of same species living in cold and humid climate.
- (ii) Temperature variation is much lesser in aquatic habitat compared to terrestrial habitat
- (iii) In deep fresh water lakes, there is gradual increase in temperature from surface to the bottom
- (iv) In an aquatic habitat production increases with insing depth.

(T = True, F = False)


- (a) FFFF    (b) TFTF    (c) TTFT    (d) FTFT

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66. 'X' is an example of Mutualism and 'Y' is an example of succession then which is the correct relationship ?
- (a) X = Hermit Crab                      Y = Gastropod  
 (b) X = Sea anemone                      Y = mesosere Succession  
 (c) X = Lichen                              Y = Xerosere  
 (d) X = Lichen                              Y = Hydrosere
67. At 't' time, population density is 'N' and at t+1 time population density is  $N_{t+1}$  / If  $N_{t+1} - N_t$  then find out the correct option
- (a)  $B-D+I-E \neq 0$                       (b)  $B-D+I-E = 0$   
 (c)  $B+D-I+E = 0$                       (d)  $B+D-I+E \neq 0$
68. Find out correct option P,Q,R,S, from the given diagram



- |     | P                | Q                | R                | S                |
|-----|------------------|------------------|------------------|------------------|
| (a) | population       | organism         | Ecosystem        | Biotic community |
| (b) | Organism         | population       | Biotic community | Ecosystem        |
| (c) | Ecosystem        | Biotic community | population       | Species          |
| (d) | Biotic community | Ecosystem        | Species          | population       |
69. Which of the following is not included as the climax community of general process of succession ?
- (a) Sedge-meadow stage                      (b) phytoplanktones  
 (c) Forest                                      (d) Grassland
70. How many sq. km. area of biosphere is occupied by marine habitat. ?
- (a) 3,62,000,000                      (b) 36 crore 20 lacs  
 (c) 36,20 Million                      (d) all of these
71. What percentage of earth is occupied by marine habitat ?
- (1) 71%    (2) 4 %    (3) 67%    (4) 29%
- (a) 1,2                      (b) 2,3                      (c) 1,4                      (d) 1
72. What is the composition of soil with high waterlogging capacity ?
- (a) Sandy soil                      (b) Black soil (loan soil)  
 (c) Rocky soil                      (d) Any one of these
73. Recently a village was badly affected by jaundice and Dengue, which of the following will decrease due to this ?
- (a) No. of persons                      (b) area                      (c) Birthrate                      (d) Death rate

74. Which is related to the given statement ?  
 In the begining of summer crow and koel lays eggs.  
 (a) As the light intensity decrease reproductive organs become active  
 (b) In some Birds increase or decrease in intensity of hight- makers reproductive organs active or inactive respecctivity  
 (c) with increase in temperture, gonads become active  
 (d) None of these
75. Population of CBM Village year wise .....
- |      |        |      |
|------|--------|------|
| 2000 | -----> | 1000 |
| 2005 | -----> | 400  |
| 2010 | -----> | 600  |
| 2012 | -----> | 800  |
- what will be the appropri/ate graph for this ?
- (a)  (b) Irruptive  
 (c) 'S' shaped (d) J shaped
76. What is correct for the given statement ?  
 Statement X : Ascaris are permanent parasites  
 Statement Y : Ascaris lives inside the host's body  
 (a) Both X&Y are correct (c) X is wrong Y is true  
 (b) Both x & Y are wrong (d) X is correct & Y is true
77. Depending on the study of bird population in diffrent areas of North Gujarat for last 10 years (2000 -2010) In which month population of bird is least ?  
 (a) February (b) September (c) April (d) October
78. Which is the correct option for the given table ?write 'T' if the given ecample is correct and 'F' for wrong example
- | Information                            | Example                    |
|--|----------------------------|
| Breed only once                        | Bamboo                     |
| Breeds many time                       | Birds like pigeon, Mammals |
| Small sized but many offsprings        | Pray Birds                 |
| less in number but big size offsprings | Only deep marine shishes   |
- (a) TFTF (b) TTFF (c) FFTT (d) TFFF
79. Biological control as pest control in agriculture is an example of .....
- (a) Predation (b) Competition (c) Emigration (d) diseases
80. The turtle of Galapagus island and the goats living there both were eating tender grass, state the relationship.  
 (a) Interspecific competition (b) Emigration  
 (c) predation (d) None of these



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81. carrying capacity of a population is determined by (BHU 2001)  
(a) Birth rate (b) Death rate  
(c) limiting resources (d) Reproductive ability ...
82. Biotic community means... [CBSC, PMT - 2001]  
(a) Group of Birds  
(b) Group of species  
(c) Group of interrelated population  
(d) Groups of interrelated ecosystem
83. What is true for the members of same species [CBSC, PMT - 2002]  
(a) Capacity of inter breeding  
(b) shows same ecological niche  
(c) show different type of ecological niche  
(d) They have different Habitat

**ANSWER KEY**

1 (a)	26 (c)	51(c)	76 (a)
2 (d)	27 (d)	52 (a)	77 (b)
3 (b)	28 (a)	53 (a)	78 (b)
4 (c)	29 (c)	54 (c)	79 (a)
5 (d)	30 (c)	55 (a)	80 (a)
6 (b)	31 (b)	56 (a)	81 (c)
7 (c)	32 (d)	57 (d)	82(c)
8 (d)	33 (c)	58 (d)	83 (a)
9 (b)	34 (b)	59 (d)	
10 (b)	35 (d)	60 (a)	
11 (c)	36 (a)	61 (b)	
12 (b)	37 (d)	62 (c)	
13 (c)	38 (d)	63 (c)	
14 (b)	39 (b)	64 (c)	
15 (a)	40 (a)	65 (d)	
16 (c)	41(a)	66 (c)	
17 (b)	42 (d)	67 (b)	
18 (a)	43 (a)	68 (b)	
19 (d)	44 (a)	69 (b)	
20 (d)	45 (c)	70 (d)	
21 (d)	46 (d)	71 (d)	
22 (c)	47 (d)	72 (b)	
23 (a)	48 (a)	73 (a)	
24 (a)	49 (b)	74 (c)	
25(c)	50 (b)	75 (b)	



## Unit-X

### Chapter-14. Ecosystem

#### IMPORTANT POINTS.

- Interaction between biotic and abiotic components is known as "Ecosystem".
- Types of Ecosystem

```

graph TD
    A[Types of Ecosystem] --> B[Natural]
    A --> C[Artificial]
    B --> D[Terrestrial]
    B --> E[Aquatic]
    D --> F[Forest]
    D --> G[grassland]
    D --> H[desert]
    E --> I[Fresh water]
    E --> J[Marine water]
    I --> K[Flowing water  
e.g. rivers, spring]
    I --> L[Stagnant water form  
e.g. ponds, lakes]
    J --> M[e.g. marine and water creek]
        
```

Components of Ecosystem -

A - Abiotic components -

1. organic substances.
2. Inorganic substances.
3. Environmental factors.
  - a - Atmospheric factors
  - b - Edaphic factors

B - Biotic components -

1. Autotrophic components - producers
2. Heterotrophic components - consumers
 

Macrophagus

e.g. Herbivores,  
Carnivores

Microphagus

e.g. decomposers  
Saprophytes

■ Functions of Ecosystem

1. flow of energy
2. Bio-geo-chemical cycle of matter.

● Food chain.

1. grazing food chain
2. Detritus food chain

● Food web -

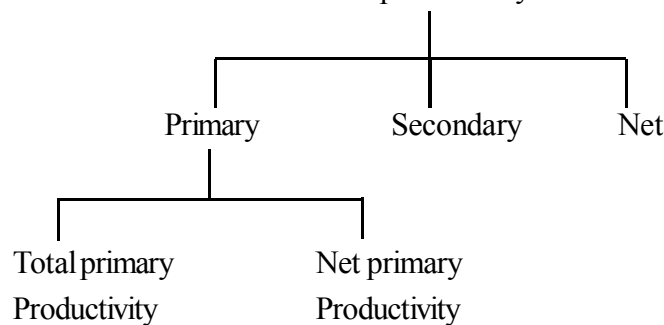
organisms have interrelationships for food in form of complex network, termed as food web.

● Ecological pyramids -

1. Numerical pyramids
2. Bio-mass pyramid
3. Energy pyramid

● Flow of energy is unidirectional in ecosystem

● During specific time period free organisms, species, population or ecosystem forms mass of organic substances or production of biomass is termed as productivity.

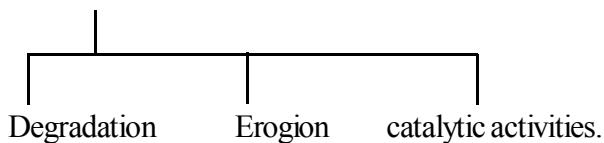


● Sequence of productivity

Forest > grass land > desert.

● In aquatic system productivity decreases with increase in depth.

● Decomposition - Dead or complex substances are converted into simple form and mixes with soil.



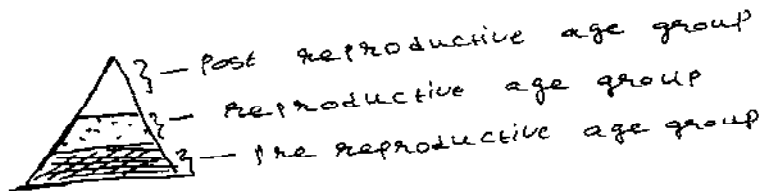
• Biogeochemical cycle

In cyclic path, from environment to organisms organisms to environment, constant & regular transport of organic substances.

There are two type of bio geo-chemical cycles

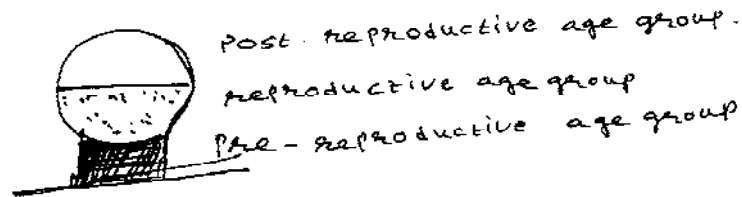
- |                   |                       |
|-------------------|-----------------------|
| 1. gaseous cycle  | 2. phosphorus cycle   |
| e.g. oxygen cycle | e.g. phosphorus cycle |
| oxygen cycle      | sulphur cycle         |

1. What does following diagram indicate ?



- |                           |                                   |
|---------------------------|-----------------------------------|
| (A) Declining Population  | (B) Constant declining Population |
| (C) Increasing Population | (D) Stable Population             |

2. Which option is not correct for the given diagram ?

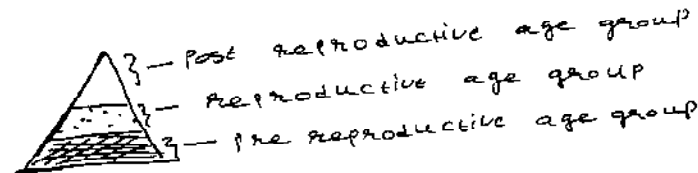


- (A) It indicate decreasing population stable  
 (B) It indicate stable population  
 (C) The post-population age group people are more in number  
 (D) The death rate is higher than birth rate

3. A Snake feed on frog, the hawk feed on this snake. What is the place of snake in foodchain?

- |                        |                       |
|------------------------|-----------------------|
| (A) producer           | (B) primary consumer  |
| (C) secondary consumer | (D) Tertiary consumer |

4. What is correct for the given diagram?



- (A) Pre-re productive group people are more in number  
 (B) Post-re productive group people are more in number  
 (C) Post-re productive group people are more less  
 (D) In it- pre productive and post reproductive age- group are placed respectively.

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5. Orchid living on the tree is an example of .....?
 

(A) Parasitic	(B) Predator
(C) Commensalism	(D) Mutualism
6. Population of which of the following will be highest in the foodchain?
 

(A) Decomposer	(B) Primary Producer
(C) Photosynthetic organism	(D) Secondary consumers
7. Who is food component of the grazing food chain?
 

(A) Consumer	(C) Decomposer
(D) Photosynthetic living organism	(D) Photosynthetic consumers
8. System resulting from interaction of all the known living factors and population of all the species of a unit area is...
 

(A) Ecology	(B) Genetics
(C) Science of plants and animal	(D) Ecosystem
9. In which of the following plants are included in any food chain?
 

(A) Primary Producer	(C) primary consumer
(B) Primary predator & producer	(D) Primary decomposer
10. Which of the following is the correct statement for food chain?
 

(A) Every chain formed by nutritional relations, is used to understand energy flow.
(B) Energy component of the food chain forms trophic level.
(C) Inter- relation amongst different food chains forms food web.
(D) All of the given
11. Which of the following uses maximum energy?
 

(A) Primary consumer	(B) Secondary consumer
(C) Decomposer	(D) Primary Producers
12. Through, which of the following, energy enters in an ecosystem?
 

(A) Herbivores	(B) Producer
(C) Decomposer	(D) Primary producers
13. Why is algae placed in first place of food chain ?
 

(A) Algae is first to synthesize food.
(B) Algae is first to consume food.
(C) Every living organism can utilize food.
(D) None of the given.
14. In which of the following wheat eating regions included ?
 

(A) Decomposer	(B) Primary consumer.
(C) primary producers	(D) secondary consumer.
15. which of the following is placed in upper most (highest) level of ecological pyramids.
 

(A) Herbivores	(B) Carnivors
(C) Primary and Secondary Producers.	(D) Primary and Secondary consumer.

16. As we proceed in food chain, bio-mass.....  
 (A) Remain Same (B) Decreases  
 (C) Increases (D) Initially same and later keep decreasing.
17. In ecosystem the source of energy is...  
 (A) ATP (B) Sun (C) The Green plant (D) Sugar.
18. Who is primary consumer of biotic community ?  
 (A) Herbivores/ Grazing animal (B) Omnivores  
 (C) Scavengers (D) Carnivores.
19. In which of the following weeds are placed ?  
 (A) Primary producers (B) Secondary consumer.  
 (C) Primary consumer. (D) Decomposer.
20. When does the energy flow start in an ecosystem ?  
 (A) When material cycle starts  
 (B) When sun rises  
 (C) When any living organisam gain food.  
 (D) When light energy is converted in chemical energy.
21. which of the following option is correct for storage place phosphorus and nitrogen respectively ?  
 (A) Consumer (B) Parental rock and environment  
 (C) Environment and producers (D) Environment and parental rock
22. An individual "x" uses mashroom as food then in which trophic level mashroom and "x" are included?  

Mashroom	X	Foodchain
(A) Secondary	Primary	→ Detritivorous food chain
(B) Primary	Secondary	→ Detritivorous food chain
(C) Primary	Secondary	→ Grazing food chain
(D) Secondary	Primary	→ Grazing food chain
23. Which of the following is trophic level of the orchid staying on mango tree ?  
 (A) First (B) Tertiary/ Third  
 (C) Second (D) Fourth
24. Which age group in pyramid indicate less reproductive potential ?  
 (A) Bell shaped  
 (C) Triangular  
 (B) Inverted Bell shaped  
 (D) All of them have equal( same) potential
25. It is correct for ecosystem.....  
 (A)( Plants, Animals, Microorganisms) + Abiotic environment  
 (B) Community formed by various species present in a particular region.  
 (C) Animal, plants and micro- organisms.  
 (D) Abiotic factors

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26. What is the original source of energy for the living organisms ?  
 (A) Carbohydrate (B) Sun light  
 (C) ATP (D) Lipid
27. In which of the following curd eating people are included ?  
 (A) Producer (B) First[1<sup>st</sup>]  
 (C) Tertory[3<sup>rd</sup>] (D) Second[2<sup>nd</sup>]
28. The functional efficiency of ecosystem is effected when decomposers are removed from it, because..  
 (A) Energy flow will stop  
 (B) Rest components decomposition will become faster  
 (C) Herbivous will not get sun light  
 (D) Flow of nutrient will stop.
29. From which of the following detritus food chain will start ?  
 (A) Algae (B) Bacteria  
 (C) Protozoa (D) Virus
30. Which of the following is gaseous cycle ?  
 (1) Sulphur cycle (3) Phosphorous cycle  
 (2) Carbon cycle (4) Nitrogen cycle  
 (A) 1 (B)1,2 (C) 3, 4 (D) 1,3,4
31. At Each trophic level, in which form energy is lost ?  
 (A) Heat (B) Chemical  
 (C) Light (D) None
32. Which Source of eutrophication is the modern source of phosphorus ?  
 (A) Detergent (B) Fertilizer  
 (C) Faecal of animal (D) Rivers
33. It helps in absorbtion of phosphorous ?  
 (A) Leaves (B) Mycorriza  
 (C) Root (D) Stem
34. In a day, How many times an individual inspire and expire (breathing) ?  
 (A) 10,000 (B) 20,000  
 (C) 40,000 (D) 50,000
35. What percentage of total metabolic energy is produced through fermentation of lactic acid ?  
 (A) 80% (B) 70%  
 (C) 100% (D) 40%
36. Which adaptation is observe only in xerophytes ?  
 (A) CAM (C) Hatch-Slack  
 (B) TCA (D) C<sub>3</sub> cycle



37. Which of the following option is correct for CO<sub>2</sub> absorption in CAM ?

- (A) During night (B) Only at midnight  
(C) During day time (D) Morning

38. It- (I) Liver → Liver lobule

(II) kidney → Uriniferous tubule

(III) Ecology → X

than What does "x" represent ?

- (A) Biotic community (B) Ecosystem  
(C) Population (D) All of the given

39. What can be Explained through following chart ?

Birds	25 ppm
↑	↑
Big fishes	2ppm
↑	↑
Small fishes	0.5ppm
↑	↑
Zoo Plankton	0.5ppm
↑	↑
Phyto planktons	0.04 ppm
↑	↑
DDT in water	0.003ppb

(i) Biological magnification concentration of DDT

(ii) Aquatic food web

(iii) Food chain

(iv) DDT is non degradable

(v) One aquatic ecosystem

- (A) (i), (ii), (iii) (B) (i), (iii), (iv)  
(C) (ii), (iii), (iv) (D) (iii), (iv), (v)

40. With reference to process of decomposition arrange the following in proper sequence.

(1) Deadmaterial → Predation by detrivore → digestion in animals → defecation → mixes with soil.

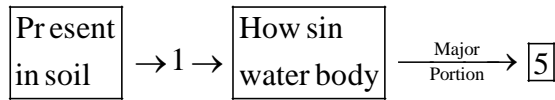
(2) Mineralization and synthesis of fertilization of substances.

(3) Complex substance  $\xrightarrow[\text{enzymes}]{\text{Extracellular}}$  Ions & salts (simple sub.)

(4) Transport of soluble substances in the inner layer of soil

(A) 1,2,3,4 (2) 1,4,3,2 (3) 3,1,4,2 (4) 1,3,4,2

41. An element which is generally obtain from rocks.  
From the given information which is correct option for the same

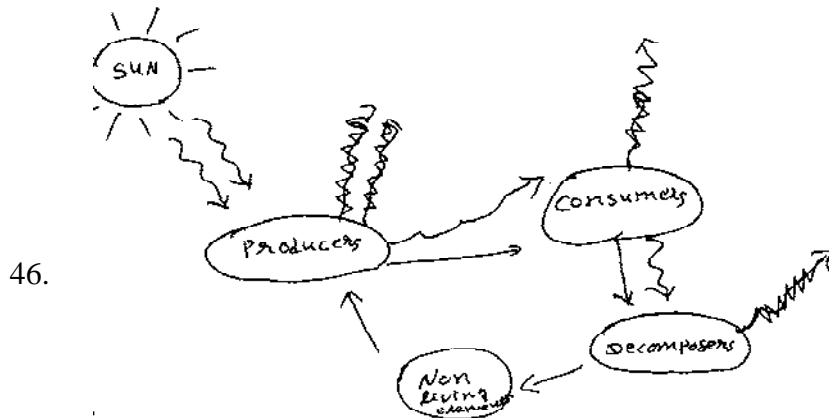


- (A) (1) dissolve in water,  
(2) depositeda at the bottom of the sea  
(3) used by forest  
(4) eaten by fishes  
(5) eaten by sea birds
- (B) (1) dissolve in water,  
(2) used by planktons  
(3) Fishes  
(4) Sea birds  
(5) deposited at the bottom of the sea
- (C) (1) Fishes  
(2) Sea birds  
(3) used by planktons  
(4) Sea birds  
(5) deposited at the bottom of the sea
- (D) (1) Fishes  
(2) used by planktons  
(3) Fishes  
(4) Sea birds  
(5) None

42. Few statements are given below in reference with Thermodynamics, Which of the following option shows all correct statements for it ?

- (I) Amount of energy is constant.  
(II) During transfer of energy some amount of energy is converted in to heat.  
(III) Free energy = energy which can do work.  
(IV) At each topic level amount of stored energy reduces.
- (A) (I) and(II)  
(B) (III) and (iv)  
(C) (i) and (iv)  
(D) All of the given

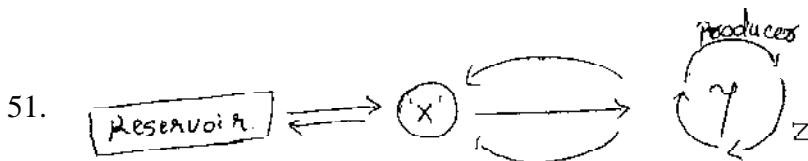
43. Food chain always start with producer, which of the following is an exceptional to the given statement.  
 (A) Rat (C) Fox  
 (B) Lion (D) Earth - worm
44. X is released in Halophytes and Y is source of it, Z process occurs in- estuary, then What does x,y,z indicate?  
 (A) X- Potassium Y - rocks  
     Z- Biological magnification  
 (B) X - DDT Y - Water  
     Y- Biological magnification  
 (C) X -Phosphorus Y - Sewage water  
     Z- Eutophication  
 (D) None of this.
45. If energy produced by producer is 1000 units, than What amount of energy will be found in highest level of consumer ?  
 (A) 100 (B) 10  
 (C) 1 (D)1000



- What does given chart indicate ?  
 (A) Structure of ecosystem.  
 (B) Type of ecosystem  
 (C) First and second law of Thermodynamics  
 (D)- Bidirerectional flow of energy.
47. What is incorrect for oxygen ?  
 (A) Most of the metabolic energy is produced by it.  
 (B) Plants are included in the organisms producing it.  
 (C) It is essential for all the organisms.  
 (D) Its proportion in water is 90%.

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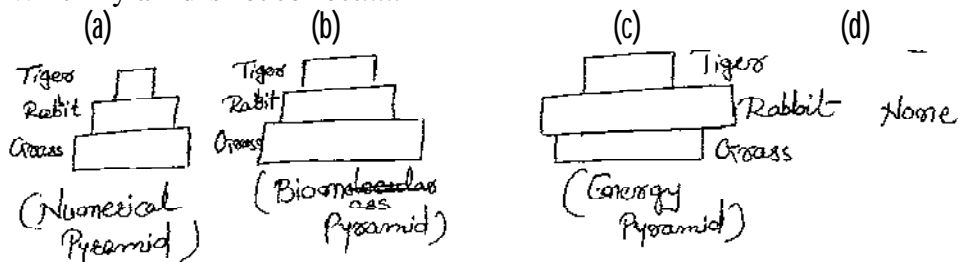
48. X is source of y. but y never return to x, Than which option is wrong for x and y.  
 (A) X = plant, Y= organic compound                      (B) X= sun, Y=Energy  
 (C) a & b Both are correct.                                      (D) A and B are Wrong.
49. What does pyramid of Bimass of an ecosystem indicate in....  
 (A) Number of species in each trophic level  
 (B) Number of organisms in each trophic level  
 (C) Organisation of tissue of each tophic level  
 (D) All of the given.
50. Which option is correct for the given information ?  
 (1) Ecosystem is an outcome of an interaction between all living components and non- living components of Environment.  
 (2) GPP= NPP- loss due to respiration  
 (3) Primary productivity is measured in dry biomass.  
 (A) TFT    (B)FFT  
 (C) FTF    (D)TTF.



- (A) x = Exchange Place                      y = Consumer                      z = Population  
 (B) x = Exchange Place                      y = Population                      z = Mclro Organism  
 (C) x= Biotic Community                      y = Population                      z = Consumer  
 (D) x = Exchange Place                      y = Biotic Community                      z = Consumer
52. What is responsible for change in the size of population of any particular area ?  
 (A) Availability of food.    (C) Pressure  
 (B) Predation    (D) All three
53. In one forest maximum 500 lions can be allowed with than what does 500 indicate ?  
 (A) Maximum birth rate    (B) Population of lion  
 (C) Carrying Capacity of Population    (D) Realed birth rate
54. At which vital index population is stable ?  
 (A) 1    (B) 0  
 (C) Infinitive    (D) 100
55. In any of the ecosystem man can be....  
 (A) Primary Consumer    (C) Secndary Consumer  
 (B) Producer    (D) a & c
56. If earth is considered a unit region then biosphere can be compared to....  
 (A) Eco-System    (C) Population  
 (B) Biotic Community    (D) Species

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57. If earth is considered a unit region then it can be compared to....  
 (A) Eco-System (B) Population  
 (C) Biotic Community (D) Species
58. Who accepts the nutrient released in environment by decomposer ?  
 (A) Consumers (B) Producers  
 (C) Secondary Consumers (D) None of the given
59. If herbivores are "5" in number in the given food chain then, what will be the total number of trophic layers in the it ?  
 (A) 7 (B) 8  
 (C) 5 (D) can not be predicted
60. which organism provided useable phosphate from dead organisms?  
 (A) Fungi, Bacteria (B) Fungi , Algae  
 (C) Bacteria, Algae (D) Bacteria, Fungi
61. How many times do we breathe per day ?  
 (A) 20,000 (B) 40,000  
 (C) 20,000 (D) None of theme
62. Which Pyramid is not correct.....



63. It is first stem of the decomposition of organic compound.  
 (A) Fragmentation - In body of Scavengers  
 (B) Catabolism - In body of decomposer  
 (C) Leaching - In soil  
 (D) Catabolism - In soil
64. Autotrophs use [X] and Produces [Y], which is store as [Z], which of the given option is correct for X, Y, and Z ?
- | X                | Y               | Z        |
|------------------|-----------------|----------|
| (A) Sunlight     | Nutrient        | Chemical |
| (B) Energy       | Chemical energy | Sunlight |
| (C) Grass (Herb) | Energy          | Starch   |
| (D) Sunlight     | Glycogen        | ATP      |
65. What is an Original Source of energy flow in any food chian ?  
 (A) Sun (B) Produces  
 (C) Primary (D) None

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66. Immature fall of floral bud and fruits are observed in a farm, and on leaves Red and purple pigments spots are observed, In which of following place is Such Symptoms will not be observed in plants  
 (A) Sea shore (B) Bank of river  
 (C) Foot hills of mountain (D) Red Soil
67. who is responsible for the process like, Phosphate Containing Organic compound → Phosphate  
 (A) Certain fungi (B) Certain algae  
 (C) Certain Specific bacteria (D) All three
68. which of the following eco-system has highest annual primary productivity ?  
 (A) Tropical deciduou forest  
 (B) Tropical Rain forest  
 (C) Temperate deciduou forest  
 (D) Temperate Ever green forest.
69. Which of the following is not a functional unit of ecosystem ?  
 (A) Stratification (B) Flow of energy  
 (C) Decompos (D) productivity.
70. Which of the following associations do not establish functional interspeciific association ?  
 (A) Mutualism (B) Exosparasite  
 (C) Endoparasite (D) Commensalism
71. Which statement is correct ?  
 (A) Plant uses CO<sub>2</sub> during respiration.  
 (B) Biomass of the plant is available to only herbivores.  
 (C) In all CO<sub>2</sub> acceptor plants, organic compounds are produce throudh photosynthesis.  
 (D) All three.
72. It is the type of photosynthesis occurs in most of the plants ?  
 (A) C<sub>4</sub> - Cycle (B) C<sub>3</sub> - Cycle  
 (C) CAM - Cycle (D) C<sub>2</sub> -Cycle
73. In which of the following alimentary canal, " starch → glucosen" is produced ?  
 (A) Producer (B) I<sup>st</sup> trophic layer  
 (C) II<sup>nd</sup> trophic layer (D) All of types
74. Which is the correct options ?

**Interspecific association**

**Examples**

(i) Reproductive

(x) Producer → Herbivorers → Carnivores.

(ii) Productive

(y) Animals and dispersion of fruit seed.

(iii) Nutritional

(z) Mimicry

(A) (i): Z

(B) (i): Z

(C) (i): Y

(D) (i):Y

(ii):X

(ii): Y

(ii): Z

(ii): X

(iii): Y

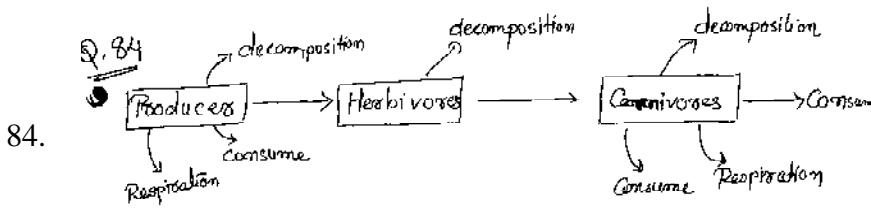
(iii): X

(iii): X

(iii) : Z

75. In an ecosystem, Which of the following is unidirectional ?  
 (A) Sulphur (B) Organic nutrient  
 (C) carbon (D) Free energy
76. Who is first to receive Phosphate released through leaching in phosphate cycle ?  
 (A) Decomposer (B) producer  
 (C) Consumer (D) None of the given
77. Which of the following is not a pair of Gaseous cycle ?  
 (A) P&N (B) N & S  
 (C) N & S (D) C & P
78. What is indicated by Pyramid of number ?  
 (A) Number of individuals at every trophic layer.  
 (B) Species belonging to a particular region.  
 (C) Number of member of biotic- community  
 (D) None of the given.
79. Which of the following has maximum importance (value) in grass- land.  
 (A) Secondary Production (B) Net Production  
 (C) Tertiary Production (D) Total Production.
80. Grass → cow → lion. If productivity of grass is 5000 kg/ Meter/ year. Then What will be the productivity of lion ? (In general)  
 (A) 500 (B) >50  
 (C) 1000 kg / mter<sup>2</sup> / year. (D) >100
81. Select correct statements  
 (i) If 90% of Carnivores are removed from forest, then forest area increases.  
 (ii) Generally 3 to 4 trophic layer are present in food chain due to loss of energy.  
 (iii) Food chain always possesses 2 to 8 trophic layers.  
 (iv) On removing 80% of tigers, number of herbivores will increase.  
 (A) (ii), (iv) (C) (i), (iii) (B) (i), (ii) (D) (iii), (iv)
82. In which stage of the Decomposition, larger surface area for future decomposition is available?  
 (A) 1<sup>st</sup> (B) 2<sup>nd</sup> (C) 3<sup>rd</sup> (D) All of the above
83. which option is Correct for the given statements x and y ?  
 X : fungi, showing low level of body organization producer with thick wall.  
 Y : On availability of favourable condition they produce sporophytic stage.
- |     |   |   |
|-----|---|---|
|     | x | y |
| (A) | √ | × |
| (B) | × | × |
| (C) | √ | √ |
| (D) | × | √ |

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In the given chart from carnivores to producer energy level gradually.

- (A) Decreases  
 (B) Increases  
 (C) Decreases & increases both are possible  
 (D) None
85. which of the given option is shows more stable ecosystem ?
- | Producer | primary consumer | Secondary consumer | Tertiary consumer | Total |
|----------|------------------|--------------------|-------------------|-------|
| (A) 100  | 200              | 150                | 80                | 530   |
| (b) 900  | 500              | 225                | 40                | 1665  |
| (c) 200  | 100              | 125                | 75                | 500   |
- (d) All of the given.
86. which of the following is one of the causes of cancer ?
- (A) Obesity  
 (B) Artheros cerosis  
 (C) Inadcquale of O<sub>2</sub> supply  
 (D) Hypertension
87. which option is more suitable for x and y ?  
 X : Animal cells posseses mitochondria.  
 Y : IN animal cell energy is released when carbohydrates are completely broken .
- (A) Both are correct  
 (B) Both are wrong  
 (C) If x is correct then only y is correct .  
 (D) X : correct Y : wrong
88. (X)  $\xrightarrow{\text{energy}}$  (Y) from x energy is available to y and from y energy do not return to x then which option correct ?
- | X             | Y         |
|---------------|-----------|
| (A) The earth | The Sun   |
| (B) The Sun   | The earth |
| (C) The Sun   | A blotic  |
- (D) All of given





96. In material cycle which of the following is last acceptor of material ?  
 (A) Producer (C) Decomposer  
 (B) Consumer (D) Is not possing
97. Which one is the maximum suitable to from top of the energy pyraind ?  
 (A) Therdary consumer (B) Secondary consumer  
 (C) Producers (D) None of this
98. Which of the following option is correct for the column I and II ?
- | <i>Column - I</i>               | <i>Column - II</i>             |
|---------------------------------|--------------------------------|
| (P) Grass                       | (i) Decomposer                 |
| (Q) Herbivors                   | (ii) Secondary carniveres      |
| (R) Frog                        | (iii) producer                 |
| (S) Hawk                        | (iv) primary consumer          |
|                                 | (v) primary carniveres         |
| (A) (P-iii) (Q-i) (R-v) (S-iv)  | (B) (P-i) (Q-iii) (R-iv) (S-v) |
| (C) (P-iii) (Q-v) (R-iv) (S-ii) | (D) (P-ii) (Q-iv) (R-v) (S-ii) |
99. Which component are basic in maintaing body processes?  
 (A) Carbohydrate (B) Water  
 (C) Energy (D) All of this
100. What is mycorhizer ?  
 (A) Root + Fungi = Symbioti (B) Root+ bacteria = Symbiotic  
 (C) fungi +Root = Parasitism (D) Fungi +leaf = Parasitism
101. It is key- compound for all living organism ?  
 (A) Sulphar (B) Phosphures  
 (C) Nitrogen (D) Calcium
102. What is obtained by the activity of decomposer for the prodneers ?  
 (A) Nutrient (C) Food  
 (B) Carbohydrate (D) Energy
103. It 1 lac living organisms are included in third throphie level than what would be the number of producers ?  
 (A)10 lac (B)10 thousand  
 (C) 1 thousand (D) 1crore (millian)
104. In an ecosystem, when organisms can be included in more than one trophic lager ?  
 (A) Phytoplankton (B) Fish  
 (C) Zooplanktm (D) Frog
105. When organism of aquatic ecosystem is at equivalent trophee level in when cow is included ?  
(DUMET...2009)  
 (A) Zooplankton (B) Phytoplakton  
 (C) Nekton (D) Benthos



**ANSWER KEY**

1	C	31	A	61	A	91	C
2	B	32	A	62	C	92	C
3	C	33	B	63	A	93	B
4	A	34	C	64	A	94	B
5	C	35	B	65	B	95	D
6	C	36	A	66	C	96	D
7	B	37	A	67	C	97	A
8	D	38	B	68	B	98	D
9	A	39	B	69	A	99	D
10	D	40	B	70	D	100	A
11	D	41	B	71	C	101	B
12	B	42	D	72	B	102	A
13	A	43	D	73	B	103	D
14	B	44	C	74	C	104	B
15	B	45	C	75	D	105	A
16	B	46	C	76	B	106	B
17	C	47	C	77	C	107	D
18	A	48	D	78	A	108	B
19	A	49	C	79	D	109	B
20	B	50	D	80	B	110	A
21	B	51	D	81	A		
22	B	52	D	82	A		
23	A	53	C	83	C		
24	B	54	D	84	B		
25	A	55	D	85	B		
26	B	56	B	86	C		
27	A	57	A	87	C		
28	D	58	B	88	B		
29	B	59	D	89	C		
30	C	60	D	90	D		



## Unit- X

### Chapter15. Biodiversity and its Conservation

#### IMPORTANT POINTS

Biodiversity refers to the variety of microbes, plants and animals of an area. It is the degree of variety in nature. It is the totality of genes, species and ecosystem. Thus it can be defined as the variety and variability of life. There is lot of variations amongst organisms. There can be genetic variations, species variations as well as ecosystem variation. On the basis of it, there are three levels of biodiversity  $\beta$  - genetic, species and ecosystem biodiversity. Species diversity can be categorised as  $\alpha$  diversity, diversity, and  $\gamma$  - diversity.

Knowledge of biodiversity is important for systematic study of organisms, ecosystem studies and biogeography studies etc. It provides food, marketable, items etc. It has social and aesthetic value. Information of biodiversity at world level national level and state level is important. The main causes of biodiversity loss are :

- |                                   |                      |
|-----------------------------------|----------------------|
| 1. Habitat loss and fragmentation | 2. over-exploitation |
| 3. Alien species invasions and    | 4. co-extinctions    |

conservation of biodiversity means the conservation of gene complexes, species and ecosystem, Biodiversity is essential to global food security and nutrition. The conservation of biodiversity are of two types: 1. In-situ conservation and 2. Ex-situ conservation. In-situ conservation is possible through to declare protected areas, biosphere reserves, national parks and sanctuaries. Ex-situ conservation can be done through botanical gardens, zoos, gene bank, pollen bank, seed bank, tissue culture and cryopreservation.

- Which is the right option for the tallest and the smallest Gymnosperm plant ?
  - Eucalyptus and *Zamia pygmaea*
  - Wolffia globosa* and Eucalyptus
  - Sequoia sempervirens* and *Zamia pygmaea*
  - Sequoia sempervirens* and *Wolffia globosa*
- Which one is odd for species diversity ?
  - $\alpha$  diversity
  - $\gamma$  diversity
  - $\beta$  diversity
  - $\lambda$  diversity
- How many biosphere reserves are present in India ?
  - 41
  - 34
  - 14
  - 43
- Which is the correct option the Amazon rain forest ?
  - In this rain forest there might be at least two million insects species waiting to be discovered and named.

- II. This forest is known as lungs of the planet.
- III. In this forest digging of mine is performed by dynamine.
- IV. This forest are destroyed for the cultivation of soyabeans.
- V. This forest contains world famous Biodiversity
- (a) i, ii, iv, v                      (b) i, ii, iii, iv                      (c) ii, iii, iv, v                      (d) iii, v, iv
5. Which micro organism is responsible for synthesis of antibiotics ?
- (a) Bacteria                      (b) Virus                      (c) Fungus                      (d) Algae
6. In which region of South America maximum species of birds can be found ?
- (a) Equador                      (b) Brazil                      (c) Colombia                      (d) Peru
7. Which scientist has classified species diversity ?
- (a) Thoeprestus                      (b) Lineus                      (c) Whittaker                      (d) Treshaw
8. Which group is meant for Endemic species of birds ?
- (a) Nilgiri pipit, Rofous babbler, Lesser-Florican
- (b) Lesser-Florican, Nilgiri wood pigeon, Malabar parakeet
- (c) Malabar parakeet, Niligiri pipit, Rofous babbler
- (d) all the above
9. How many Indian plant species are used to extract essential oils and scents ?
- (a) 50                      (b) 500                      (c) 50,000                      (d) 5000
10. Which is the correct option.
- (a) There is chance in Natural selection in evolution process due to alpha biodiversity
- (b) There is chance in Natural selection in process of evolution due to genetic diversity
- (c) There is chance in Natural selection in process of evolution due to Ecosystem biodiversity
- (d) There is chance in Natural selection in process of due to biocommunity diversity
11. Which is the state plant of Gujarat ?
- (a) Polyalthia    (b) Prosopis                      (c) Ficus                      (d) Neem
12. Which can be used for cryopreservation at  $196^{\circ}\text{C}$  temprature ?
- (a) liquid  $\text{N}_2$     (b) Free  $\text{N}_2$                       (c) liquid  $\text{Co}_2$                       (d) Solid  $\text{N}_2$
13. How many protected areas are present in India ?
- (a) 89                      (b) 581                      (c) 492                      (d) 34
14. What can be done by the number of species in habitat ?
- (a) Measurement of species diversity in habitat
- (b) Measurement of gene diversity of species in habitat
- (c) Measurement of interaction of biocommunities
- (d) Measurement of function of Ecosystem

15. Which type of relation is found in between richness of species and variety of phylum ?  
 (a) Hyperbola (b) Circular hyperbola  
 (c) Rectangular hyperbola (d) Reciprocal
16. Which is the right option for national animal and bird of India ?  
 (a) Peacock & Lion (b) Flamingo & Tiger  
 (c) Peacock & Tiger (d) Flamingo & Lion
17. Which is the right sequence for Ecological diversity ?  
 (a) Biomes → habitat → Ecosystem → population  
 (b) Biomes → Ecosystem → habitat → niches  
 (c) Biomes → Ecosystem → population → niches  
 (d) Biomes → habitat → niches → Ecosystem
18. Which one is maintained in botanical garden of Waghai in Gujarat ?  
 (a) Fibrous plants (b) Etable plants (c) Economical plants (d) medicinal plant
19. Where the knowledge of biodiversity is applicable ?  
 (a) To study, classification of animals and plants. (b) To study, Ecosystem  
 (c) To study, Biogeological region (d) all the given
20. How many botanical gardens are registered in IABG ?  
 (a) 1500 (b) 80,000 (c) 800 (d) 900
21. Which information is correct for our country ?  
 (a) India is one of the twelve mega biodiversity countries of the world.  
 (b) India comprises 2.4% biodiversity of world.  
 (c) India contains more than 7 % plant species of world.  
 (d) India stands at 7<sup>th</sup> rank in traditional crop varieties.
22. Species diversity is responsible for which phenomena ?  
 (a) process of Evolution  
 (b) speciation  
 (c) For alternative types (allele) of gene.  
 (d) For stability and normal function of Ecosystem
23. Which is the wild flower of symbol of Gujarat state ?  
 (a) Calotropis procera (b) Eicchornia cresipis  
 (c) Indian laburnum (d) Oscimum sanctum
24. Which statement is correct for buffer zone of biosphere reserve ?  
 (a) It is legally protected  
 (b) Authority takes cooperation with local people.  
 (c) Environmental Education is facilitated by this zone.  
 (d) Hunting and felling of trees occur in this zone.

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25. Biodiversity of which organism is more in Eastern Ghat in comparison to Western Ghat ?  
(a) Reptilia                      (b) Amphibian                      (c) Aves                      (d) Mammals
26. What is Ecosystem diversity ?  
(a) similarity of species diversity in Ecosystem  
(b) Variation in species diversity in Ecosystem  
(c) Mutation in species diversity in Ecosystem  
(d) Homozygosity in species diversity in Ecosystem
27. How can the biodiversity can be conserved ?  
(a) By maintenance of different species  
(b) By maintenance of genes of different species.  
(c) By maintenance of different Ecosystem  
(d) all of the given
28. Which regions are included in Biodiversity Hot-spot ?  
(a) Sanctuary                      (b) National park  
(c) Only Hotspot                      (d) all the given
29. How many mangroves species are founds in marine bio diversity of India?  
(a) 45                      (b) 341                      (c) 54                      (d) 431
30. Which one is odd for India ?  
(a) 7<sup>th</sup> rank in agriculture species.  
(b) origin place of 166 species of crop plants.  
(c) Primary centre for domestication of ginger, turmeric, citrus, cardamom.  
(d) It contains 12 mega biodiversity region.
31. Which one is the correct pair ?  
(a) Bali Tiger – Endangered species                      (b) Caspian Tiger – Extinct species  
(c) Javan Tiger – Rare species                      (d) all the given.
32. Which one is correct for tropical forest of Gujarat ?  
(a) Thorn forest                      (b) Moist deciduous forest  
(c) Dry deciduous forest                      (d) all the given
33. For which animal sunderbans is declared as a National Park ?  
(a) Lion                      (b) Rhino                      (c) Tiger                      (d) Wild ass
34. Which one is odd for Amzon rain forest ?  
(a) Africa                      (b) Russia                      (c) Mauritius                      (d) Java
35. Among the recently extinct animal, Guagga is of which country ?  
(a) Mammals-472                      (b) Reptile-427 (c) Birds-1300                      (d) piceis-3000



36. Which reason is responsible for extinction of host fish and parasites.  
 (a) co-extinctions (b) Alien species invasions  
 (c) over exploitation (d) loss of habitat
37. Which rock species of Western Ghat is extinct due to quarrying?  
 (a) Tectona and Terminalia (b) Bamboo and Boswelia  
 (c) Bignonia and Habanera (d) Madhuela and Acacia
38. Which organisation is active for conservation of biodiversity at world level?  
 (a) WWF (b) WCU (c) a and b both (d) EE
39. Which statements are true.  
 1. At present there are 14 biosphere reserves in India.  
 2. Biospheres includes 3 zones.  
 3. Bandipur, Periyar, Kaziranga and Hazirabaugh are biosphere reserve  
 4. UNO has formulated the concept of biosphere reserve.  
 5. Core Zone is the inner most region of biosphere reserve.  
 (a) 1, 2, 4 (b) 3, 5, 2 (c) 1, 3, 4, 5 (d) 1, 2, 5
40. Find odd one out :-  
 (a) Project Elephant (b) Tiger Project  
 (c) Gir Lion Project (d) Project Wild ass
41. Which one is correct for individual of the same species ?  
 (a) Population (b) Biotic Community  
 (c) Ecosystem (d) All the given
42. Which animal is remnant gene pool in the world ?  
 (a) Flamingo (b) Painted Frog  
 (c) Wild ass (d) Spring tailed Lizard
43. Find odd one out :  
 (a) Nanda devi (b) Great Nicobar (c) Mannar (d) Thar
44. Animals and plants are used as a food that means.....  
 (a) Destruction value of biodiversity (b) Utility value of biodiversity  
 (c) Ecosystem services (d) all the given
45. Which option is correct for endemism..  
 1. Any group which can be found in small region.  
 2. Any group which can be found in large region.  
 3. Group of species which can be found in definite region.  
 4. Any group which can be not found anywhere else.  
 5. Endemic species which can be found everywhere.  
 (a) 1, 2, 3 (b) 1, 3, 4 (c) 2, 3, 5 (d) only 2 and 5

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46. In which zone there is no disturbance. (AFMC-2002)  
 (a) Buffer zone (b) Core Zone (c) Transition zone (d) All the given
47. Which is the example of ex-situ conservation ? (Orrisa – 2002)  
 (a) National park (b) Sanctuary (c) Biosphere reserve (d) Zoo
48. Which type of information is obtained form Red-List ? (Kerala – 2002)  
 (a) Red coloured fishes (b) Red eyed birds  
 (c) Endangered plants and animals (d) Red coloured insects
49. Which is true for wild life conservation ? (CPMT – 2002)  
 (a) Hunting of prey (b) ex-situ conservation  
 (c) In-situ conservation (d) B and C both
50. Which is the main cause of extinction of wild life ? (CBSE – 1999)  
 (a) Destruction of habitat (b) Hunting for flesh  
 (c) Pollution of medicine and water (d) All the given
51. At which place animals and plants are most protected ?  
 (a) Botanical gardens (b) National Park (c) Zoos (d) Sanctuary
52. For which animal Gir National Park is famous ? (BV-2001)  
 (a) Tiger (b) Asiatic Lion (c) Leopard (d) Deer
53. Which is not applicable institute conservation ? (KCET – 2007)  
 (a) National Park (b) Sanctuary (c) Botanical Garden (d) Biosphere reserve
54. Which one is protected in national park ? (Maharashtra CET – 2008)  
 (a) Micro organism (b) Only plants (c) Plants and animals (d) None
55. What is called the biodiversity of different ecosystem of geographical area ? (Kerala-2007)  
 (a)  $\alpha$  diversity (b)  $\delta$  – diversity (c)  $\beta$  diversity (d)  $\gamma$  diversity
56. What is called the area which is remain around the core zone of biosphere region ? (HPPMT 2006)  
 (a) Buffer (b) Transition zone (c) Developed zone (d) Peripheral zone
57. Which is the Hot spot of India ? (AIPMT – 2006)  
 (a) Gangatic plain (b) Western Ghat (c) Eastern Ghat (d) Arravali mountain
58. Which is included in types of biodiversity ? (AMU – 2004)  
 (a) Genes (b) Species (c) Ecosystem (d) All the given
59. Which is the most appropriate method for conservation of wild life ? (JharkhandCEE-2008)  
 (a) Vaccination (b) Hybridization  
 (c) conservation in natural habitat (d) Killing of predator

60. Where Mangroves forest found ? (Orissia – 2003)  
 (a) Dry region                      (b) Coastal region                      (c) Open area                      (d) tropical region
61. Where is the genes of rare plants species to stored ? (AIPMT 2000)  
 (a) Gene bank                      (b) Gene Library                      (c) Herberium                      (d) none of them
62. Which is the Hotspot region ? (PMT 2005)  
 (a) Region which is having volcanoes  
 (b) Region which is having possibility of earth quake  
 (c) Coastal region which is having species diversity  
 (d) Region which is having Tsunami
63. For which animal Project Gir is famous ? (AIIMS 1996)  
 (a) Elephant                      (b) Hangul                      (c) Tiger                      (d) Lion
64. MAB means ..... (CBSE 1997)  
 (a) Man and biosphere programme  
 (b) Mammal and biological programme  
 (c) Mammal and biosphere programme  
 (d) Men and biological programme
65. Who publish Red-list ? (KCET 1997)  
 (a) WWF                      (b) IUCN                      (c) MAB                      (d) IBWL
66. In India different types of mangoes species are example of ..... (AIIMS 2005/2008)  
 (a) species diversity                      (b) Genetic diversity  
 (c) Induced mutation                      (d) Breeding
67. Which pair contains maximum diversity and endemic species in India ? (AIIMS -2008)  
 (a) Sunderban and runn of Kutch                      (b) Eastern Ghat and West Bangal  
 (c) East Himalaya and Western Ghat                      (d) Kerala and Punjab
68. Which number is correct for Indentified popular species ? (PUMET 2010)  
 (a) 1.1 to 1.1 million                      (b) 0.5 to 1.0 million  
 (c) 2.5 to 3.0 million                      (d) 1.7 to 1.8 million
69. IUCN means ..... (DUMET 2010)  
 (a) International union for conservation of nature and natural resources  
 (b) Indian union for conservation of nature and natural resources  
 (c) International union for conservation of nature and nutrients resources  
 (d) Indian Union chemical nomenclature
70. In India, which example has maximum varieties ?  
 (a) Wheat                      (b) Rice                      (c) Mango                      (d) Tea

71. In India, Western ghat is known as Hot-spot because of ..... (KCET 2007)  
 (a) Evergreen forest (b) High endemism  
 (c) more height (d) Topical climate
72. What is important of gene diversity ? (HP PMT 2006)  
 (a) Maintenance of species (b) speciation  
 (c) Research of genetic code (d) Maintenance and research of spices
73. How many plant species are there in India ? (DPMT 2008)  
 (a) 40,000 (b) 80,000  
 (c) 58,000 (d) 45,500
74. What is called the biodiversity of habitat ? (JIPMER – 2007)  
 (a)  $\alpha$  diversity (b)  $\beta$  diversity  
 (c)  $\gamma$  diversity (d) Biosphere
75. Which is the modern concept of conservation ?  
 (a) Biosphere reserve (b) sanctuary  
 (c) National park (d) Protected forest

**Column type Questions : -**

76. Match the following.

**Column – 1**

- (p) Tulsi  
 (q) Akdo  
 (r) Asopalav  
 (s) Khejdo

- (a) (q - i),  
 (b) (s - i),  
 (c) (s - i),  
 (d) (q - i),

- (r - ii),  
 (p - ii),  
 (q - ii),  
 (s - ii),

**Column – 2**

- (i) Calotropis procera  
 (ii) Prosopis cineria  
 (iii) Polyalthia longifolia  
 (iv) Osimum saltum

- (s - iii), (p - iv)  
 (r - iii), (q - iv)  
 (p - iii), (r - iv)  
 (r - iii), (p - iv)

77. Match the following.

**Column – 1**

- (p) Shool paneshwar  
 (q) Ratan mahal  
 (r) Velavadar  
 (s) Narayan sarovar

- (a) (r - i),  
 (b) (q - i),  
 (c) (q - i),  
 (d) (p - i),

- (p - ii),  
 (p - iii),  
 (p - iii),  
 (q - ii),

**Column – 2**

- (I) Sloth Bear  
 (ii) chinkara  
 (iii) Flying squirrel  
 (iv) Black Buck

- (s - iii), (q - iv)  
 (s - iv), (r - ii)  
 (s - ii), (r - iv)  
 (s - iii), (r - iv)

78. Match the following.

**Column – 1**

- (p) Rare species
- (q) Extinct species
- (r) Recently extinct species
- (s) Endemic species

- (a) (q - i), (r - ii),
- (b) (p - i), (q - ii),
- (c) (r - i), (p - ii),
- (d) (p - i), (s - ii),

**Column – 2**

- (i) Guagga
- (ii) Painted Frog
- (iii) Passenger Pegoon
- (iv) Malabar Parakeet

- (s - iii), (p - iv)
- (s - iii), (r - iv)
- (q - iii), (s - iv)
- (r - iii), (q - iv)

79. Match the following.

**Column – 1**

- (p) Assam
- (q) Uttar Pradesh
- (r) Gujarat
- (s) Madhya Pradesh

- (a) (p - i), (q - ii),
- (b) (r - i), (s - ii),
- (c) (s - i), (q - ii),
- (d) (q - i), (r - ii),

**Column – 2**

- (i) Corbatt National Park
- (ii) Marine National Park
- (iii) Kaziranga National Park
- (iv) Kanha National Park

- (s - iii), (r - iv)
- (q - iii), (p - iv)
- (r - iii), (p - iv)
- (p - iii), (s - iv)

80. Match the following.

**Column – 1**

- (p) Biosphere reserve
- (q) Hot-spot
- (r) Biodiversity of Gujarat
- (s) Greatest biodiversity

- (a) (r - i), (p - ii),
- (b) (r - i), (q - ii),
- (c) (p - i), (r - ii),
- (d) (q - i), (s - ii),

**Column – 2**

- (i) Eastern Himalayan
- (ii) Amazon
- (iii) Great Nicobar
- (iv) Marine National Park

- (s - iii), (q - iv)
- (p - iii), (s - iv)
- (q - iii), (s - iv)
- (p - iii), (r - iv)

81. Match the following.

**Column – 1**

- (p) Endemic species
- (q) Alien species
- (r) Habitat loss
- (s) over exploitation

**Column – 2**

- (i) Sping Tailed Lizard
- (ii) Nilgiri pipit
- (iii) African cat fish
- (iv) Lion tailed Macaque

- |     |          |           |            |          |
|-----|----------|-----------|------------|----------|
| (a) | (p - i), | (q - ii), | (r - iii), | (s - iv) |
| (b) | (q - i), | (r - ii), | (s - iii), | (p - iv) |
| (c) | (q - i), | (r - ii), | (p - iii), | (s - iv) |
| (d) | (s - i), | (p - ii), | (q - iii), | (r - iv) |

82. Match the following.

**Column – 1**

- (p) Keoladeo Ghana Sanctuary
- (q) chilka sarovar sanctuary
- (r) Sultanpur sanctuary
- (s) Thol sanctuary

**Column – 2**

- (i) Gujarat
- (ii) Rajasthan
- (iii) Orrisa
- (iv) Hariyana

- |     |          |           |            |          |
|-----|----------|-----------|------------|----------|
| (a) | (p - i), | (r - ii), | (s - iii), | (q - iv) |
| (b) | (r - i), | (s - ii), | (p - iii), | (q - iv) |
| (c) | (q - i), | (p - ii), | (r - iii), | (s - iv) |
| (d) | (s - i), | (p - ii), | (q - iii), | (r - iv) |

83. Match the following.

**Column – 1**

- (p) National Bureau of Plant  
Genetic Resources
- (q) World Wild life Fund
- (r) National Bureau of fish  
Genetic Resources
- (s) National Bureau of Animal  
Genetic Resources

**Column – 2**

- (I) Conservation of biodiversity
- (ii) Conservation of gene of domesticated animal
- (iii) Conservation of gene of crop plant
- (iv) Conservation of gene of Economically valuable  
species

- |     |          |           |            |          |
|-----|----------|-----------|------------|----------|
| (a) | (r - i), | (p - ii), | (q - iii), | (s - iv) |
| (b) | (r - i), | (q - ii), | (p - iii), | (s - iv) |
| (c) | (r - i), | (p - ii), | (s - iii), | (q - iv) |
| (d) | (q - i), | (s - ii), | (p - iii), | (r - iv) |

84. Match the following.

**Column – 1**

- (p) Bhal region
- (q) Forest of Vijaynagar
- (r) Narayan Sarovar
- (s) Marine Wild life

**Column – 2**

- (i) Mangrove diversity
- (ii) Gugal
- (iii) Indigenous variety of Wheat
- (iv) White Musli

- |     |          |           |            |          |
|-----|----------|-----------|------------|----------|
| (a) | (r - i), | (s - ii), | (q - iii), | (p - iv) |
| (b) | (s - i), | (p - ii), | (r - iii), | (q - iv) |
| (c) | (r - i), | (s - ii), | (p - iii), | (q - iv) |
| (d) | (s - i), | (r - ii), | (p - iii), | (q - iv) |

85. Match the following.

**Column – 1**

- (p)  $\alpha$  diversity
- (q)  $\beta$  diversity
- (r)  $\gamma$  diversity

**Column – 2**

- (i) Richness of different species in a habitat
- (ii) Richness of different species along with a gradient from one habitat to another habitat within the community
- (iii) Richness of different species in different habitat

- |     |          |           |            |
|-----|----------|-----------|------------|
| (a) | (p - i), | (r - ii), | (q - iii), |
| (b) | (p - i), | (q - ii), | (r - iii), |
| (c) | (q - i), | (p - ii), | (e - iii), |
| (d) | (r - i), | (q - ii), | (p - iii), |

**Question number 86 to 95 are Statement (A) and reason (R) type question.**

**Options for due no 86 to 95.**

- (a) Both A and R are true and R is correct explanation of A
- (b) Both A and R are true but R is not correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

86. Statement A :- Wile ass sanctuary is a unique habitat of Indian Wild ass.

Reason R :- It is the remnant gene pool in the world

- |     |     |     |     |
|-----|-----|-----|-----|
| (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|

87. Statement A :- There is threat to the indigenous cat fish in our rivers

Reason R :- African cat fish (alien species) produces toxic effect for agriculture

- |     |     |     |     |
|-----|-----|-----|-----|
| (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|

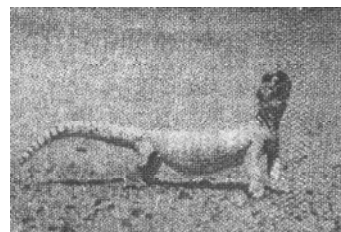
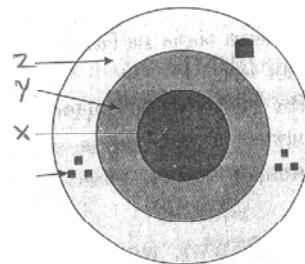
88. Statement A :- In-situ conservation is a type of biodiversity conservation.

Reason R :- It is the conservation of resources out side their natural habitat.

- |     |     |     |     |
|-----|-----|-----|-----|
| (a) | (b) | (c) | (d) |
|-----|-----|-----|-----|

Questionbank Biology

89. Statement A :- Biodiversity is important to maintain ecosystem and biosphere of the world  
Reason R :- Biodiversity provides food for mankind and their pets  
(a) (b) (c) (d)
90. Statement A :- Gene bank is important for conservation of crop variety and Wild genetic resources.  
Reason R :- Their utility in future crop improvement and forestation programmes  
(a) (b) (c) (d)
91. Statement A :- In National Park Wild life is strictly protected  
Reason R :- In National Park, activity such as forestry, grazing, cultivation are not allowed  
(a) (b) (c) (d)
92. Statement A :- Biogonia and Hebenaria are extinct species of Western Ghat.  
Reason R :- There is continues quarrying activity in Western Ghat  
(a) (b) (c) (d)
93. Statement A :- In seed bank seeds are stored for a long time.  
Reason R :- Gene bank is option for conservation of rare genes  
(a) A (b) B (c) C (d) D
94. Statement A :- some activities are allowed in sanctuaries.  
Reason R :- There are four marine sanctuaries in Gujarat.  
(a) A (b) B (c) C (d) D
95. Statement A :- The biodiversity is not uniform throughout the world  
Reason R :- biodiversity increases as we move from equator to polar region  
(a) A (b) B (c) C (d) D
96. Which is the correct one regarding to bird sanctuaries in Gujarat ?  
(a) Thol, Nalsarovar, Narayan sarovar (b) Nalsarovar, Shoolpaneshwar, Vansda  
(c) Thol, Narayan sarovar, Velavadar (d) Ratanmahal, Nalsarovar, Vansda
97. Which option is correct for the 'z' in given figure.  
(a) There is no disturbance  
(b) Different activities are perform for conservation  
(c) Indicated zone is buffer.  
(d) All the given
98. Which region is shown 'y' indicated zone above figure ?  
(a) core zone  
(b) Transition zone  
(c) buffer zone  
(d) Internal Area



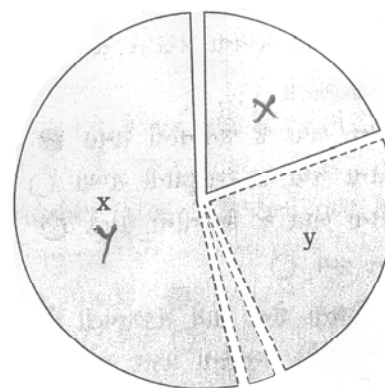


99. Which one is correct option for the given figure?

- (a) Nalsarovar
- (b) Thol sarovar
- (c) Narayan sarovar
- (d) Sultanpur sarovar

100. What is indicated by 'x' and 'y' in given figure ?

- (a) x = 3 lac species of plant  
y = 40,000 species of vertebrates
- (b) x = 8,00,000 species of insects  
y = 3,00,000 species of plants
- (c) x = 8,00,000 species of insects  
y = 3,00,000 species of plant
- (d) x = 3,00,000 species of plant  
y = 8,00,000 species of insects



**ANSWER KEY**

1	c	26	b	51	b	76	d
2	d	27	d	52	b	77	c
3	c	28	a	53	c	78	c
4	a	29	a	54	c	79	d
5	c	30	a	55	d	80	d
6	c	31	b	56	a	81	d
7	c	32	d	57	b	82	c
8	a	33	c	58	d	83	d
9	b	34	d	59	c	84	d
10	b	35	a	60	b	85	b
11	d	36	a	61	a	86	a
12	a	37	b	62	c	87	a
13	b	38	c	63	d	88	c
14	a	39	d	64	a	89	b
15	c	40	d	65	b	90	a
16	c	41	a	66	b	91	a
17	b	42	c	67	c	92	a
18	d	43	d	68	d	93	b
19	d	44	a	69	a	94	c
20	c	45	b	70	c	95	c
21	a	46	b	71	b	96	a
22	d	47	d	72	b	97	b
23	c	48	c	73	d	98	c
24	c	49	d	74	a	99	c
25	b	50	a	75	a	100	d



**Unit -X****Chapter-16. Environmental Issues****IMPORTANT POINTS**

Any undesirable changes in physical, chemical or biological characteristics of air, land or soil is called pollution. The substances which bring such changes are called pollutants.

Air pollution is mainly due to burning of fossil fuel like coal, petroleum, automobiles and industries. They are harmful to living organism and must be reduced. Unwanted sound creates noise pollution which can be controlled by reducing high intensity of sound.

Polluted water causes many diseases. Most common source of this is domestic waste and industrial effluents which reduce dissolved oxygen and increases BOD. Water pollutants rich in nutrients like nitrogen and phosphorus cause eutrophication thus induces excessive growth of aquatic plants.

Increasing concentration of nonbiodegradable toxic waste like DDT at various tropic level of food chain is known as biomagnifications.

Disposal of hazardous waste like Radioactive and e-waste requires additional efforts. Agrochemicals like pesticides and fertilizers and plastic creates soil pollution.

Major environmental issues like green house effect and depletion of ozone layer in stratosphere is due to more emission of gases like CO<sub>2</sub>, CH<sub>4</sub>, CFCs and nitrous oxides

and deforestation. This increases global temperature and brings drastic change in the atmosphere affecting living organisms. Depletion of ozone layer due to CFCs increases skin cancer, mutation and other disorders.

Government of India has introduced concept of Joint Forest Management to work closely with the local communities for protecting and managing forests.

To save our forests and environment

Concept of Joint Forest Management has introduced by Govt of India helps in bringing forest personality and local communities to work jointly for protecting and managing forests.

1. Pollution is any undesirable change in physical, chemical and biological characteristics of.  
(A) Land (B) Soil (C) Air and Water (D) All of these
2. To protect and improve the quality of our environment which act was passed and in Which year?  
(A) The environment act 1986  
(B) The environment act 1988  
(C) The Air (Prevention and control of pollution) act 1981  
(D) The Water (Prevention and control of pollution) act 1974
3. What is the effect of air pollution on living organisms?  
(A) Reduce growth and yield of crops

- (B) Cause premature death of plants  
 (C) Premature leaf fall  
 (D) Both A and B
4. Which gas is responsible for increase in atmospheric temperature?  
 (A) O<sub>2</sub>            (B) CO<sub>2</sub>            (C) SO<sub>2</sub>            (D) CO
5. 99% of SPM in the exhaust of thermal power plant can be separated by...  
 (A) Electrostatic precipitators    (B) Solvents            (C) Scrubber            (D) Chimney
6. In an Electrostatic precipitators the velocity of air blown between the plates must be.  
 (A) Low            (B) High            (C) Moderate            (D) Very high
7. The Scrubber is used to remove gases like...  
 (A) SO<sub>2</sub>            (B) NO<sub>2</sub>            (C) CO<sub>2</sub>            (D) SO<sub>3</sub>
8. Particulate matter of which size causes greatest harm to human health?  
 (A) 2.5 micrometer or less in diameter            (B) More than 2.5 micrometer  
 (C) More than 3.5 micrometer            (D) Less than 3.5 micrometer
9. Which type of damage can be caused by Particulate matter of 2.5 micrometer or less in diameter to human health?  
 (A) Breathing and respiratory symptoms            (B) Inflammation and damage to lungs  
 (C) Premature death of an individual            (D) All of these
10. Which is the main cause of atmospheric pollution in major cities?  
 (A) Industrialization            (B) Noise  
 (C) Automobiles            (D) Dust particles and SPM
11. Which catalyst should be fitted into filters in order to reduce emission of poisonous Gases?  
 (A) Selenium            (B) Rhodium  
 (C) Magnesium            (D) Manganese
12. Which metal is the main air pollutant in metro cities?  
 (A) Lead            (B) Copper            (C) Magnesium            (D) Iron
13. Which catalyst converts unburnt hydrocarbons into CO<sub>2</sub> and H<sub>2</sub>O?  
 (A) Platinum-Palladium            (B) Platinum-Chloride  
 (C) Palladium- Chloride            (D) Lead
14. What is the effect of catalytic converter on carbon monoxide and nitrogen oxide of exhaust?  
 (A) Converts them into CO<sub>2</sub> and H<sub>2</sub>O  
 (B) Converts them into CO<sub>2</sub> and Nitrogen gas  
 (C) Converts them into CO<sub>2</sub> and NH<sub>4</sub>  
 (D) It converts them into CO<sub>2</sub> and NO<sub>2</sub>
15. In which year noise was also included as an air pollutant?  
 (A) 1981            (B) 1987            (C) 1986            (D) 1984
16. Sound waves of \_\_\_\_\_ decibels causes damage to eardrum or permanently impair hearing?  
 (A) 150db or more            (B) 120db or more            (C) More than 80db            (D) 110db

17. Which type of pollution causes altered breathing pattern, increased heartbeats and sleeplessness?  
 (A) Noise pollution                      (B) soil pollution  
 (C) Radioactive pollution              (D) Thermal pollution
18. According to 1990s survey which city ranked 4<sup>th</sup> among the 41 most polluted cities of the world?  
 (A) Ankleshwar                      (B) Delhi                      (C) Japan                      (D) China
19. Name the metropolitan city leading the country in its levels of air pollution.  
 (A) Ankleshwar                      (B) Delhi                      (C) Chennai                      (D) Bangalore
20. Which is the drastic change seen in Delhi public transport after 2002?  
 (A) All the buses run by CNG                      (B) Use of unleaded petrol  
 (C) Use of LPG in buses                      (D) All the buses run by methanol
21. Which is correct according to EURO II norms?  
 (A) Sulphur can be controlled at 350ppm in diesel and 150ppm in petrol  
 (B) Sulphur can be controlled at 150ppm in petrol  
 (C) Lead can be controlled at 350ppm in diesel  
 (D) Lead can be controlled at 150ppm in petrol
22. Which harmless gases are produced by smokes stacks of thermal power plant and smelters?  
 (A) N<sub>2</sub>, O<sub>2</sub>                      (B) CO<sub>2</sub>                      (C) CO, N<sub>2</sub>                      (D) SO<sub>2</sub>
23. For reducing vehicular pollution which measures are taken by Delhi government?  
 (A) Phasing out old vehicles  
 (B) Use of unleaded and low sulphur petrol and diesel  
 (C) Use of catalytic converter in vehicles  
 (D) All of these
24. In which cities Bharat stage II is applied from 1<sup>st</sup> april'2005?  
 (A) Delhi, Mumbai, Chennai, Baroda, Surat  
 (B) Delhi, Mumbai, Kanpur, Baroda, Surat  
 (C) Delhi, Mumbai, Chennai, Baroda, Pune  
 (D) Mumbai, Pune, Bangalore, Surat, Ahmedabad
25. A substantial fall in the level of which gases have been found between 1997 to 2005 in Delhi?  
 (A) CO<sub>2</sub>, SO<sub>2</sub>                      (B) CO<sub>2</sub>, CO, SO<sub>2</sub>  
 (C) CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>2</sub>                      (D) CO<sub>2</sub>, CO, CFC
26. To safeguard our water resource the amendment was passed in the year.  
 (A) 1974                      (B) 1981                      (C) 1986                      (D) 1987
27. Which chemical of petrol inactivates the catalysts of filter for reducing emission of poisonous gases?  
 (A) Lead                      (B) Rhodium                      (C) Strontium                      (D) Iron
28. Which colloidal material is seen in domestic sewage?  
 (A) Sand and silt                      (B) Fecal material and bacteria  
 (C) Sodium and calcium                      (D) Phosphorus



41. Thinning of eggshell and their premature breaking is due to  
 (A) Eutrophication (B) Global warming  
 (C) Green house effect (D) Biological magnification
42. Aging of lake is accelerated by  
 (A) Cultural Eutrophication (B) Biological magnification  
 (C) Biological accumulation (D) Algal bloom
43. Which chemicals increase growth of aquatic organism?  
 (A) Nitrogen and phosphorus (B) Calcium and iron  
 (C) Nitrogen and calcium (D) Nitrogen and iron
44. Arrange the following statements with reference to accelerated eutrophication in proper manner.  
 (p) Silt and debris pile up at the bottom of the lake  
 (q) Marsh plants take roots in the shallows begin to fill the lake basin  
 (r) Introduction of large number of nitrogen and phosphate in the pond  
 (s) Encouragement of growth of aquatic organisms.  
 (A) p,q,r,s, (B) r,s,q,p (C) r,s,p,q (D) s,r,p,q
45. Give full form of FOAM.  
 (A) Friends of Arcata Marsh (B) Friends of Arctic Marsh  
 (C) Friends of Antarctic Marsh (D) Foam of Arcata Marsh
46. In which cities Ecosan toilets are working?  
 (A) Kerala and Srilanka (B) Shrinagar and Kerala  
 (C) Kullu and Srilanka (D) Tamilnadu and Kerala
47. Recycling of e-waste is done in developing countries like...  
 (A) China, India, Pakistan (B) India, Pakistan Shrilanka  
 (C) China, Pakistan, Bangladesh (D) China, India, Shrilanka
48. Name the metals recovered during recycling process of e-waste.  
 (A) Gold, Nickle, Copper, Silicon (B) Gold, Copper, Silver, Magnecium  
 (C) Gold, Silver, Copper, Selenium (D) Nickle, Copper, Silicon Silver
49. Increase in the concentration of a nonbiodegradable substance of various tropic level is called  
 (A) Eutrophication (B) Global warming  
 (C) Biological bloom (D) Biological magnification
50. Deforestation results in  
 (A) Change in climatic condition (B) Reduce rain fall  
 (C) Loss of biodiversity (D) All of these
51. Chipko movement is associated with prevention of  
 (A) Air pollution (B) Cutting of trees  
 (C) River pollution (D) Construction of dams
52. Jhum refers to.  
 (A) Crop Cultivation (B) Social forestry  
 (C) Shifting cultivation (D) Large scale agriculture

Questionbank Biology

53. Ultraviolet radiation from sunlight causes a reaction that produces  
(A) Fluorides (B) CO (C) SO<sub>2</sub> (D) Ozone
54. The biological amplification of DDT in various trophic levels is known as  
(A) Eutrophication (B) Global warming  
(C) Biological bloom (D) Biological magnification
55. BOD is related to  
(A) Detergents (B) Inorganic pollutants  
(C) Organic pollutants (D) Organophosphorus
56. CFC's split up in stratosphere to release chlorine by the action of..  
(A) UVA (B) UVB (C) UVC (D) All of these
57. Noise was recognized as air pollutant through amendment of  
(A) Environment act (B) the air act (C) Noise act (D) All of above
58. If there was no CO<sub>2</sub> in the earth's atmosphere, the temperature of earth's surface would be.  
CBSE1995  
(A) Dependent on amount of O<sub>2</sub> in the atmosphere  
(B) Higher than present  
(C) Less than present  
(D) The same
59. With the help of Electrostatic precipitators how much particulate pollutants can be removed?  
(A) 50% (B) 99% (C) 40% (D) 100%
60. Enrichment of a water body with organic waste results in sudden algal bloom. This phenomenon is known as  
(A) Eutrophication (B) Aqua bloom  
(C) Biological bloom (D) Biological magnification
61. Which of the following is mismatched?  
(A) Fossil fuel burning - Release of CO<sub>2</sub>  
(B) Nuclear power station - Radioactive waste  
(C) Solar energy - Green house effect  
(D) Biomass combustion - Release of CH<sub>4</sub>
62. Which of the following is not causing pollution?  
(A) Thermal power plant (B) Nuclear power plant  
(C) Automobiles (D) Hydroelectric power plant
63. Soil conservation can be best achieved by having ...  
(A) Wind screen (B) Good plant cover  
(C) Restricted human activity (D) Low rain fall
64. Biological treatment of water pollution can be done by  
(A) Lichens (B) Phytoplankton (C) Algae (D) None of these



65. Eichornia is a ...  
 (A) Desert plant (B) Water plant (C) Terrestrial plant (D) Parasitic plant
66. Who created the Haryana Welfare Club?  
 (A) Ramesh Dagar (B) Sunderlal Bahuguna (C) Ahmad Khan (D) Suresh Dagar
67. What is the major problem of using nuclear energy?  
 (A) Accidental leakage (B) It is very costly (C) Safe Disposal (D) Both A and C
68. Which is the recommended depth to bury nuclear waste?  
 (A) 500mts (B) 5000mts (C) 600mts (D) 50mts
69. Name the natural phenomenon responsible for heating of earth's surface and atmosphere?  
 (A) Global warming (B) Green house effect (C) Eutrophication (D) Aforestation
70. What is the average temperature of earth maintained by green house effect?  
 (A) 15°C (B) 18°C (C) 25°C (D) 30°C
71. In which form earth's surface reemits heat?  
 (A) UV radiation (B) Infrared radiation (C) Gamma rays (D)  $\alpha$  and  $\beta$  rays
72. Which gases are commonly known as green house gases?  
 (A) CO<sub>2</sub> & CH<sub>4</sub> (B) CO<sub>2</sub> & NH<sub>4</sub> (C) CO & N<sub>2</sub> (D) NH<sub>4</sub>, CO, SO<sub>2</sub>
73. What is correct for the region labeled as a, b, c and d?  
 (A) a- CO<sub>2</sub> 60% , b- CH<sub>4</sub> 20% , c- CFC 14% , d- N<sub>2</sub>O 6%  
 (B) a- CFC 60% , b- CH<sub>4</sub> 20% , c- CO<sub>2</sub> 14% , d- N<sub>2</sub>O 6%  
 (C) a- CFC 60% , b- CO<sub>2</sub> 20% , c- CH<sub>4</sub> 14% , d- N<sub>2</sub>O 6%  
 (D) a- CFC 60% , b- CH<sub>4</sub> 20% , c- N<sub>2</sub>O 14% , d- CO<sub>2</sub> 6%
74. In the given chart of biological magnification what does a and b indicate?  
 Fish eating birds- DDT - 25ppm  
 (A) a=phytoplanktons, b=insects eating bird  
 (B) a= Zooplanktons , b=large fish  
 Small fish- DDT - 0.5ppm  
 (c) a=DDT-0.03ppm, b=DDT-2ppm  
 (D) a=DDT-0.04ppb, b=DDT-2ppb  
 Water- DDT - 0.0003ppm
75. Name the disease caused by water pollution?  
 (A) Polio (B) Typhoid (C) Tuberculosis (D) Leprosy
76. Which disease is not caused by water pollution?  
 (A) Cholera (B) Typhoid (C) Tuberculosis (D) Dysentery
77. Which is the main pollutant content of domestic sewage?  
 (A) Biodegradable organic matter (B) Biodegradable inorganic matter  
 (C) Fluorohydro carbons (D) Dissolve salts



Questionbank Biology

78. What is the result of El Niño Effect?  
 (A) Melting of polar ice caps (B) Rise in sea level  
 (C) Melting of Himalayan snow caps (D) All of these
79. What are the reasons for soil erosion and desertification?  
 (A) Over cultivation (B) Unrestricted grazing  
 (C) Deforestation (D) All of these
80. Heavy metals can be defined as elements with density...  
 (A)  $>5\text{g/cm}^3$  (B)  $<5\text{g/cm}^3$  (C)  $<5\text{g/m}^3$  (D)  $>5\text{g/cm}^3$
81. What should be the forest cover recommended by National forest policy 1988?  
 (A) 30% in plains and 76% in hills (B) 33% in plains and 67% in hills  
 (C) 35% in plains and 76% in hills (D) 22% in plains and 70% in hills
82. Name the community known for its peaceful coexistence with nature?  
 (A) Bishnoi (B) Bikaneries (C) Krishnoi (D) Jhodhapuries
83. Bad ozone is formed in \_\_\_\_\_ layer of atmosphere?  
 (A) Troposphere (B) Stratosphere (C) Thermosphere (D) Ozonosphere
84. What is snow blindness?  
 (A) Can not see due to Cataract  
 (B) Cannot see in the snow  
 (C) Inflammation of cornea  
 (D) Inflammation of eyeball
85. Which atoms are released by the action of UV rays on CFC?  
 (A) O (B) C (C) F (D) Cl
86. In which part of atmosphere degradation of ozone takes place?  
 (A) Troposphere (B) Stratosphere (C) Thermosphere (D) Ozonosphere
87. Measurement of ozone layer is done by \_\_\_\_\_ unit.  
 (A) Du (B) Db (C) Ds (D) dv
88. Formation of ozone gas in upper layer depends on  
 (A) UV rays (B) Infrared (C) gamma rays (D)  $\alpha$  rays.
89. In the water of flooded river what type of change is seen in BOD?  
 (A) Increases (B) Decreases (C) Remains same (D) Drastic decrease
90. The death of fishes due to Eutrophication is because of  
 (A) Increase  $\text{O}_2$  content (B) Decrease  $\text{CO}_2$  content  
 (C) Decrease  $\text{O}_2$  content (D) Increase  $\text{CO}_2$  content
91. When huge amount of sewage is dumped in a river the BOD will  
 (A) Increases (B) Decreases (C) Remains same (D) Drastic decrease
92. The Montreal protocol was made effective from..  
 (A) 1987 (B) 1989 (C) 1976 (D) 1986

93. What do you understand by greenhouse effect?  
 (A) Increase in temperature due to increase in O<sub>2</sub> concentration of the atmosphere  
 (B) Decrease in temperature due to decrease in O<sub>2</sub> concentration of the atmosphere  
 (C) Increase in temperature due to increase in CO<sub>2</sub> concentration of the atmosphere  
 (D) Decrease in temperature due to decrease in CO<sub>2</sub> concentration of the atmosphere
94. In which sphere of atmosphere the ozone layer is seen?  
 (A) Troposphere (B) Stratosphere (C) Homosphere (D) Thermosphere
95. The release of phosphates and nitrates in lakes and ponds leads to  
 (A) Reduce algal growth (B) Eutrophication  
 (c) Nutrient enrichment (D) Both B and C
96. Deforestation has an alarming effect on  
 (A) Soil erosion (B) increase in grazing area (C) weed control (D) All of these
97. Amruta Devi Bishnoi Wild life Protection award has recently instituted for  
 (A) Extraordinary courage and dedication in protecting wildlife  
 (B) Extraordinary courage and dedication in protecting plants  
 (C) Extraordinary courage and dedication in protecting wild animals  
 (D) Extraordinary courage and dedication in Protecting Environment
98. Which is the main factor of water pollution?  
 (A) Ammonia (B) Smog (C) detergents (D) None of these
99. Which one of these has highest levels of DDT deposition?  
 (A) Eel (B) Phytoplankton's (C) Sea gull, Eagle (D) Crab
100. Exhaust of motor vehicles produces pollutants like  
 (A) CO (B) Hydrocarbons (C) SO<sub>2</sub> (D) All of these
101. The stress reaction is caused by  
 (A) Air pollution (B) Nuclear pollution (C) Water pollution (D) Noise pollution
102. Deforestation may reduce the chances of... (CBSE1990)  
 (A) Rain fall (B) Frequent cyclones  
 (C) Erosion of surface soil (D) Frequent landslide
103. Most severe environmental hazard to mankind is due to.... (DPMT1986)  
 (A) Air pollution (B) Radioactive pollution  
 (C) Water pollution (D) Noise pollution
104. Which is biodegradable pollutant?  
 (A) Mercury salts (B) Polythene bags (C) Domestic sewage (D) Aluminum canes
105. According to government of India's new policy what should be the level of aromatic hydrocarbons of the concerned fuel?  
 (A) 40% (B) 30% (C) 42% (D) 35%
106. What would have been the temperature of the earth without green house effect?  
 (A) -15° C (B) -28° C (C) -18° C (D) -10° C

Questionbank Biology

107. Which is the native place of Bishnoi community?  
 (A) Bikaner (B) Jodhpur (C) Jamshedpur (D) Jaipur
108. Formation of ozone hole is maximum over. .CBSE1997  
 (A) Antarctica (B) Europe (C) Africa (D) India
109. The main problem arose due to green revolution is...  
 (A) Over production of food (B) Water logging  
 (C) Soil salinity (D) Both B and C
110. What is importance of catalytic converter?  
 (A) They increase average of the vehicles  
 (B) They reduce emission of harmful gases  
 (C) They convert CO and nitric oxide into CO<sub>2</sub> and H<sub>2</sub>O  
 (D) Both B and C
111. With the help of \_\_\_\_ SO<sub>2</sub> is removed from the industrial exhaust?  
 (A) Electrostatic precipitators (B) Solvents  
 (C) Scrubber (D) None of these
112. How much forest area is lost in tropics and temperate regions respectively?  
 (A) 40%, 1% (B) 1%, 40%  
 (C) 33%, 40% (D) 40%, 33%
113. What is the rise in the temperature of earth since last three decades?  
 (A) 0.6° C (B) 0.5° (C) 6° C (D) 5° C
114. How can we control global warming?  
 (A) By reducing the use of fossil fuel  
 (B) Afforestation  
 (C) By slowing down the growth of human population  
 (D) All of these
115. What is the present scenario of deforestation in India as compared to beginning of twentieth century?  
 (A) Beginning of twentieth century 30%, now 19.4%  
 (B) Beginning of twentieth century 30%, now 18.4%  
 (C) Beginning of twentieth century 33%, now 19.4%  
 (D) Beginning of twentieth century 23%, now 16.4%
116. What should be the forest cover recommended by National Forest policy (1988)?  
 (A) 33% for the plains, 67% for the hills  
 (B) 40% for the plains, 60% for the hills  
 (C) 24% for the plains, 76% for the hills  
 (D) 23% for the plains, 77% for the hills
117. Ozone depletion in the stratosphere will cause .. AIMS1992  
 (A) Increased incidence of skin cancer (B) Forest fire  
 (C) Global warming (D) None of these

118. Eutrophication causes decrease in .. AIMS1996  
 (A) Dissolved oxygen (B) Dissolved salts  
 (C) Dissolved hydrogen (D) All of these
119. Green house effect is caused by... AFMC2002  
 (A) Green plants (B) Infra red rays  
 (C) Uv rays (D) X-rays
120. Ozone hole refers to... AFMC2001  
 (A) Reduction in thickness of ozone layer in troposphere  
 (B) Reduction in thickness of ozone layer in stratosphere  
 (C) Hole in ozone layer in stratosphere  
 (D) Increased concentration of ozone
121. Green house effect is due to..... AMU2001  
 (A) Higher CO<sub>2</sub> concentration (B) Absorption of infrared rays by gases & dust particles  
 (C) Ratification of atmosphere (D) Both B & C
122. As it travels along the food chain the concentration of DDT.. KCET2001  
 (A) Increases (B) Stays constant  
 (C) Decreases (D) Fluctuates randomly.
123. Reason for ozone hole is KCET2001  
 (A) Increased UV radiation (B) Green house effect  
 (C) Global warming (D) Acid rain
124. In the coming year skin related disorders might be more common due to ... CBSE1997  
 (A) Use of detergents (B) Water pollution  
 (C) Depletion of ozone layer (D) Air pollution
125. Which unit is used for measuring thickness of ozone layer? AIIMS2009  
 (A) P (B) DU (C)  $\mu$  (D) RA.
126. Match the items given in column I and II
- | Column-I                | Column-II                |
|-------------------------|--------------------------|
| (P) Catalytic converter | (i) Cl                   |
| (Q) Scrubber            | (ii) CO & Nitrogen oxide |
| (R) Polyblend           | (iii) SO <sub>2</sub>    |
| (S) Freon               | (iv) Plastic             |
- (A) (p-ii), (q-iii), (r-iv), (s-i)  
 (B) ( p-i), (q-ii) ,(r-iii), (s-iv)  
 (C) (p-ii), (q-iii), (r-I), (s-iv)  
 (D)(p-iv), (q-i),(r-ii) ,(s-iii)

127. Match the items given in column I and II

KeralaPMT2011

**Column-1**

**Column-II**

- |  |   |
|--|---|
| (P) Electrostatic precipitator<br>(Q) Scrubber<br>(R) Catalytic converter<br>(A)(p-i) ,(q-ii),(r-iii)<br>(C)(p-iii),(q-ii),(r-i) | (i) Removes gases like SO <sub>2</sub><br>(ii) Removes impurities from exhaust of vehicles<br>(iii) Removes particulate matter<br>(B) (p-iii),(q-i),(r-ii)<br>(D)(p-ii),(q-i),(r-iii) |
|--|---|

128. Match the items given in column I and II

**Column-1**

**Column-II**

- |   |   |
|---|---|
| (P) CNG<br>(Q) Ozone<br>(R) Catalytic converter<br>(S) Noise<br>(A) ( p-i), (q-ii) ,(r-iii), (s-iv) )<br>(C) (p-ii), (q-iii), (r-I), (s-iv) | (i) Rhodium<br>(ii) Db<br>(iii) Du<br>(iv) Non carcinogenic<br>(B) (p-iv), (q-iii), (r-i), (s-ii)<br>(D)(p-iv), (q-i),(r-ii) ,(s-iii) |
|---|---|

129. Match the items given in column I and II

**Column-1**

**Column-II**

- |  |   |
|--|---|
| (P) Biodegradable waste<br>(Q) Nonbiodegradable waste<br>(R) Recyclable waste<br>(A)(p-iii) ,(q-ii),(r-i)<br>(C)(p-ii),(q-iii),(r-i) | (i) Bottles,cans,metals<br>(ii) Domestic waste,cow dung<br>(iii) Mercury,DDT<br>(B) (p-ii),(q-i),(r-iii)<br>(D)(p-i),(q-ii),(r-iii) |
|--|---|

130. Match the items given in column I and II

**Column-1**

**Column-II**

- |   |  |
|---|--|
| (P) Global warming<br>(Q) Eutrophication<br>(R) Biological magnification<br>(S) Green house effect<br>(A) (p-iv), (q-i),(r-ii) ,(s-iii)<br>(C) (p-ii), (q-iii), (r-I), (s-iv) | (i) Mercury,DDT<br>(ii) Rise in sea level<br>(iii) CH <sub>4</sub> ,CO <sub>2</sub><br>(iv) Algal bloom<br>(B) ( p-i), (q-ii) ,(r-iii), (s-iv)<br>(D) (p-ii), (q-iv), (r-i), (s-iii) |
|---|--|

131. Match the items given in column I and II

**Column-1**

**Column-II**

- |   |   |
|---|---|
| (P) 1988<br>(Q) 1974<br>(R) 1980<br>(S) 1987<br>(A) (p-iv), (q-iii), (r-i), (s-ii)<br>(C) (p-iv), (q-iii),(r-ii) ,(s-i) | (i) Noise pollution added in Air act<br>(ii) Concept of joint forest management<br>(iii) Chipako movement<br>(iv) Natoinal Forest policy<br>(B) ( p-i), (q-ii) ,(r-iii), (s-iv)<br>(D) (p-ii), (q-iv), (r-i), (s-iii) |
|---|---|

132. Match the items given in column I, II and III

Column-I	Column-II	Column-III
(P) Garhwal	(i) Ramesh Dagar	(a) Bishnoi Community
(Q) Jodhpur	(ii) Ahmad Khan	(b) Chipako movement
(R) Haryana	(iii) Sunderlal Bahuguna	(c) Polyblend
(S) Bangalore	(iv) Amruta Devi	(d) Organic farming
(A) (p-iii-b), (q-iv-a), (r-i-d), (s-ii-c)      (B) ( p-i-a), (q-ii -b) ,(r-iii-c), (s-iv-d)		
(C) (p-iii-b), (q-iv-a), (r-ii-c), (s-i-d)      (D)(p-iv-b), (q-i-c),(r-ii-a) ,(s-iii-d)		

133. Match the items given in column I and II

Column-I	Column-II
(P) Water accumulation in potted plant	(i) Chemical fertilizers
(Q) Aquatic weed	(ii) Mercury, DDT
(R) Eutrophication	(iii) Eichhornia
(S) Nonbiodegradable	(iv) Water logging
(A) (p-ii), (q-iv), (r-i), (s-iii)      (B) ( p-i), (q-ii) ,(r-iii), (s-iv)	
(C) (p-iv), (q-iii),(r-ii) ,(s-i)      (D) (p-iv), (q-iii), (r-i), (s-ii)	

134. For the given statement which option is correct?

Statement:

- (X) Air pollution causes injury to all living organisms.  
 (Y) The harmful effect depends on the concentration of pollutants, duration .  
 (A) Both X and Y are correct. Y gives correct explanation for X  
 (B) Both X and Y are correct. Y does not give correct explanation for X  
 (C) X is correct, Y is wrong  
 (D) X is wrong and Y is correct

135 . For the given statement which option is correct?

Statement:

- (X) Polyblend is a fine powder of recycled modified plastic.  
 (Y) In Bangalore roads are made of mixture of Polyblend and bitumen which increases Strength of the road.  
 (A) Both X and Y are correct. Y gives correct explanation for X  
 (B) Both X and Y are correct. Y does not give correct explanation for X  
 (C) X is correct, Y is wrong  
 (D) X is wrong and Y is correct

136. For the given statement which option is correct?

Statement:

- (X) Due to green revolution production of crop is more.  
 (Y) Water logging and soil salinity is the outcome of green revolution.

- (A) Both X and Y are correct. Y gives correct explanation for X
- (B) Both X and Y are correct. Y does not give correct explanation for X
- (C) X is correct, Y is wrong
- (D) X is wrong and Y is correct

137. For the given statement which option is correct?

Statement:

- (X) Unleaded petrol should be used in automobiles with catalytic converter to reduce pollution.
- (Y) Lead in the petrol inactivates Rhodium and palladium.

- (A) Both X and Y are correct. Y gives correct explanation for X
- (B) Both X and Y are correct. Y does not give correct explanation for X
- (C) X is correct, Y is wrong
- (D) X is wrong and Y is correct

138. For the given statement which option is correct?

Statement:

- (X) DDT and plastic both are nonbiodegradable Waste
- (Y) As the time passes, Pollutants of domestic sewage does not remain pollutants.

- (A) Both X and Y are correct. Y gives correct explanation for X
- (B) Both X and Y are correct. Y does not give correct explanation for X
- (C) X is correct, Y is wrong (D) X is wrong and Y is correct

139. For the given statement which option is correct?

Statement

- (X) Organic farming means agriculture with the help of chemicals.
- (Y) 500 members of Haryana Kissan welfare club have adopted this agricultural practice.

- (A) Both X and Y are correct. Y gives correct explanation for X
- (B) Both X and Y are correct. Y does not give correct explanation for X
- (C) X is correct, Y is wrong
- (D) X is wrong and Y is correct

140. For the given statement which option is correct?

Statement

- (X) Deforestation is one of the important factor for global warming.
- (Y) Green house gas CO<sub>2</sub> increases due to deforestation.

- (A) Both X and Y are correct. Y gives correct explanation for X
- (B) Both X and Y are correct. Y does not give correct explanation for X
- (C) X is correct, Y is wrong
- (D) X is wrong and Y is correct

141. How many molecules of ozone can be decomposed by one atom of chlorine?

- (A) 100
- (B) 2.00.000
- (C) 1.00.000
- (D) 1000



142. Which gas is responsible for increase in atmosphere temperature?  
 (A)  $O_2$                       (B)  $CO_2$                       (C)  $SO_2$                       (D)  $CO$
143. Slash and burn agriculture means..  
 (A) Agriculture on desert land                      (B) Jhum cultivation  
 (C) Cultivation on hills                      (D) Reforestation.
144. Which of the following is responsible for protection of living organism on earth?  
 (A) Ozone layer                      (B) Green house strategy  
 (C) Troposphere                      (D) Uvrays
145. With respect to value of BOD, arrange the following in descending order.  
 i) Distilled water                      ii) Tap water  
 iii) Industrial effluent                      iv) Sewage discharge in the river  
 (A) i – ii – iii – iv                      (B) iii – iv – ii – i  
 (C) iv – iii – ii – i                      (D) ii – I – iv – iii
146. Domestic sewage with -----% impurities is unfit for human use.  
 (A) 0.2%                      (B) 0.01%                      (C) 0.1%                      (D) 0.02%
147. Green house Effect is the cumulative result of the influence of certain gases.  
 Identify the gas which is not involved in the influence                      Karnataka2005  
 (A)  $CO$                       (B)  $CFC$                       (C)  $N_2$                       (D)  $CH_4$
148. If fertilizers are added to fresh water ..                      AIIMS2002  
 (A) Plants will die                      (B) Eutropication will occur  
 (C) Fish population will decrease                      (D) Overall animal population will decrease
149. With the help of electrostatic precipitator which Air pollutant produced by cement factory is separated?  
 (A)  $NO_2$                       (B)  $CO$                       (C)  $SO_2$                       (D)  $SPM$
150. Which of the following does not occur when the sewage is discharged into the river?  
 (A) Eutropication                      (B) Depletion of  $O_2$   
 (C) Increase in  $O_2$                       (D) Algal bloom                      DPMT2003



**ANSWER**

1	d	36	d	71	d	106	c	141	c
2	a	37	c	72	a	107	b	142	b
3	d	38	a	73	a	108	a	143	b
4	b	39	a	74	b	109	d	144	a
5	d	40	b	75	b	110	b	145	b
6	a	41	d	76	c	111	c	146	c
7	a	42	a	77	a	112	a	147	c
8	a	43	a	78	d	113	a	148	b
9	d	44	c	79	d	114	d	149	d
10	c	45	a	80	a	115	a	150	a
11	b	46	a	81	b	116	a		
12	a	47	a	82	a	117	a		
13	a	48	a	83	a	118	a		
14	b	49	d	84	c	119	b		
15	b	50	d	85	d	120	c		
16	a	51	b	86	b	121	d		
17	a	52	c	87	a	122	a		
18	b	53	d	88	a	123	a		
19	b	54	d	89	a	124	c		
20	a	55	c	90	c	125	b		
21	a	56	b	91	a	126	a		
22	a	57	a	92	b	127	b		
23	d	58	c	93	c	128	b		
24	d	59	b	94	b	129	b		
25	a	60	a	95	d	130	d		
26	a	61	c	96	a	131	c		
27	a	62	d	97	a	132	a		
28	b	63	b	98	d	133	d		
29	a	64	b	99	c	134	a		
30	a	65	b	100	d	135	a		
31	d	66	a	101	d	136	a		
32	d	67	d	102	a	137	a		
33	a	68	a	103	b	138	b		
34	b	69	b	104	c	139	d		
35	c	70	a	105	c	140	a		





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