VIDHYA SRI ACADEMY

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NEW ONLINE TEST
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TRB - P.G. PHYSICS - UNIT – IV – Statistical Mechanics

1. Degenerate energy level is one which has,
   A) Several energy states having same energy
   B) Several energy states having lower energy
   C) Several energy states having higher energy
   D) Several energy states in the increasing order of energy
2. Which one of the following is also called as the thermodynamic state
   A) Micro state B) Macro state
   C) Both micro and macro states D) Equilibrium state
3. Ensemble approach was developed by
   A) Liouville B) Helmholtz C) Joule D) Gibbs
4. Which one of the following statements is/are incorrect with first law of thermodynamics?
   i) Existence of an internal energy function
   ii) Principle of Conservation of energy
   iii) Thermals Equilibrium
   iv) Heat as energy in transit due to temperature difference
   A) (i) and (ii) B) (iii) and (iv) C) (ii) only D) (iii) Only
5. Third law of thermodynamics implies that
   A) T = 0° K cannot be attained even by infinite numbers of process
   B) T = 0° K cannot be attained by infinite numbers of process
   C) T cannot be negative
   D) Even at T = 0, there is non , Zero entropy

6. In a cyclic Process
   A) Work done is Zero
   B) Work done by the system is equal to the quantity of heat given to the system
   C) Work done does not depend on the quantity of heat given to the system
   D) The internal energy of the system increases
7. In an isothermal change, the internal energy of molecules
   A) May increase or decrease
   B) Increases
   C) Decreases
   D) Does not change

8. In a canonical ensemble, a system A of fixed volume is in contact with a large reservoir B then,
   A) A can exchange only energy with B
   B) A can exchange only particles with B
   C) A can exchange neither energy nor particles with B
   D) A can exchange both energy and particles with B
9. Which of the following statements is true?
   A) Fermions are distinguishable whereas bosons are not
   B) Bosons are distinguishable whereas fermions are not
   C) Both fermions and bosons are distinguishable
   D) Both fermions and bosons are indistinguishable but classical particles are distinguishable
10. Two particles are said to be distinguishable when
   A) The average distance between them is large compared to their de-Broglie wavelengths
   B) The average distance between them is small compared to their de-Broglie wavelengths
   C) They have overlapping wave packets
   D) Their total wave function is symmetric under particle exchange.
11. Consider a system of 2 identical particles each of which can be in any one of 3 single particles states. The number of states of the systems are possible in B.E statistics
   A) 9 B) 3 C) 6 D) 1
12. Maxwell – Boltzmann distribution law is
   A) $n_i = \frac{g_i}{e^{\alpha + \beta E_i}}$
   B) $n_i = \frac{g_i}{e\, \beta E_i}$
   C) $n_i = \frac{g_i}{e^{\alpha + \beta E_i - 1}}$
   D) $n_i = \frac{g_i}{e^{\alpha + \beta E_i + 1}}$
13. The microstate is defined by
   A) Pressure and volume of the gas
   B) Pressure and Temperature of the gas

C) Pressure a Temperature and volume of the gas

D) Position and velocity component of the molecules

14. Which of the following is incorrect for an adiabatic process?

A) $PV^r = constant$ B) $TV^{r-1} = constant$

C) $\frac{PV^{r-1}}{T^r}$ = constant D) PV = constant

15. The combined form of first and second laws of thermodynamics is given by

A) Tds = dU + PdV B) dQ = Tds + PdV

C) dU = Tds + dQ D) Tds = dU – PdV

16. The density of state in the phase space can be shown to be equal to

A) h^3 B) $1/h^3$ C) h^2 D) h

17. Pauli's exclusion principle is obeyed by

A) Particles with zero spin B) Bosons

C) Fermions D) Particles with either integral or half integral spin

18. The average energy of mono atomic gas is

A) $\overline{E} = 3/2\ KT$ B) $\overline{E} = 5/2\ KT$

C) $\overline{E} = 7/2\ KT$ D) $\overline{E} = \frac{9}{2} KT$

19. The relation between the number of states (w) and entropy (s) is

A) S = Klnw B) S = Klnw! C) S = Kln$1/w$ D) S = Kw

20. Stirling approximation is represented by

A) log n! = n log n – n B) log n! = n log n

C) log n = n log n – n ! D) log n = n! log n – n

21. Liouville's theorem $\partial\rho/\partial t = 0$ holds for,

A) microcanonical ensemble only B) Canonical ensemble only

C) grand canonical ensemble only D) All ensembles

22. The conditions for the heat flow are specified in ……. law of thermodynamics

A) Zeroth law B) First Law

C) Second Law D) Third law

23. The statistical theory which supports the zero point energy of a gas even at absolute zero is

A) Classical statistics B) B.E. statistics

C) F.D. Statistics D) M.B. Statistics

24. A gas behaves as an ideal gas

A) at very low pressure and high temperature

B) high pressure and low temperature

C) high temperature and high pressure

D) low pressure and low temperature

25. The temperature of a gas is a measure of

A) The average K.E. of the gaseous molecules

B) The average P.E. of the gaseous molecules

C) The average distance between the molecules of the gas

D) The size of the molecules of the gas

TRB - P.G. PHYSICS - UNIT – IV

Test No.1

1	A	9	D	17	C
2	B	10	A	18	A
3	D	11	C	19	A
4	D	12	A	20	A
5	B	13	D	21	B
6	B	14	D	22	A
7	D	15	A	23	B
8	A	16	B	24	A

25. A