VOLUME-03 Part B and C

MCQs/ Objectives

5. Thermodynamics & Statistical Physics

1. E.M.F. developed in a thermocouple can be measured by:
   a) Pyrometer b) Thermometer
   c) Potentiometer d) Calorimeter

2. The amount of heat required to raise the temperature of a unit mass of the substance by 1^0 is known as:
   a) Quantity of heat b) Specific heat
   c) Latent heat d) Mechanical equivalent of heat

3. Which of the following materials is the best conductor of electricity?
   a) Copper b) Gold
   c) Plastic d) Platinum

4. The amount of heat required to convert one gm of water to gas without a change in its temperature is:
   a) 273 cal. b) 252 cal.
   c) 540 cal. D) 459 cal.

5. The physical process during which there is neither gain nor loss of heat from the system is called:
   a) Adiabatic operation b) Isothermal operation
   c) Isentropic d) Endothermic

6. Mean free path of gas molecules is:
   a) Directly proportional to pressure b) Directly proportional to volume
   c) Inversely proportional to pressure d) Inversely proportional to volume

7. The temperature of a gas is a measure of the:
   a) Average of K.E. of the molecule b) Average of P.E. of the molecule
   c) Average of K.E. and P.E. of the molecule d) Average heat energy of the molecule

8. Temperature remaining constant, the volume of an enclosed mass of gas varies inversely as the pressure, this law is given as:

   a) Boyle's Law
   b) Charle's Law
   c) Avogadro's Law
   d) Newton's Law

9. In a limit volume of the ideal gas, the pressure is equal to:

   a) $1/2$ of the total value of K.E. of the molecules
   b) $2/3$ of the total value of K.E. of the molecules
   c) $1/3$ of the total value of K.E. of the molecules
   d) $2/3$ of the total value of P.E. of the molecules

10. In a four stroke-cycle heat engine, power is obtained only from:

   a) Second stroke
   b) Third stroke
   c) Second and third stroke combined
   d) Fourth stroke

11. The temperature at which the root mean square velocity of gas molecules will become twice of that at 100^0C is:

   a) 240^0C
   b) 273^0C
   c) 572^0C
   d) 1219^0C

12. The conversion of a gas into a liquid under high pressure and low temperature is called:

   a) Condensation
   b) Liquefaction
   c) Fusion
   d) Evaporation

13. In a adiabatic change:

   a) $PV =$ constant
   b) $PV^2 =$ constant
   c) $\frac{PV}{T} = R$
   d) $PV = T$

14. The thermal efficiency of the heat engine is equal to:

   a) $\frac{WH}{J}$
   b) $\frac{WJ}{H}$
   c) $\frac{W}{JH}$
   d) $\frac{JH}{W}$

15. The relationship between the energy radiated, E by a black body per unit of time and the absolute temperature is given by:

a) $E \propto \frac{1}{T^4}$ b) $E \propto \frac{1}{T^2}$

c) $E \propto T^2$ b) $E \propto T^4$

16. The maximum efficiency of a diesel engine is about:

a) 20% b) 30%

c) 40% d) 60%

17. Kinetic energy per gram molecule per degree of freedom is equal to:

a) $\frac{1}{2}RT$ b) $\frac{1}{3}RT$

c) $\frac{2}{3}RT$ d) $\frac{3}{4}RT$

18. Energy associated with each degree of freedom is:

a) $\frac{1}{2}KT$ b) KT^2

c) $\frac{3}{2}KT$ d) $\frac{3}{2}KT^2$

where, K= Boltzmann's constant; T= Absolute temperature of the gas

19. At what temperature, pressure remaining unchanged, will the velocity of hydrogen molecules be double of its value of N.T.P.?

a) 619^0C b) 819^0C

c) 1092^0C d) 273^0C

20. If S is the distance travelled during N collisions then mean free path λ of a gas molecule is given by:

a) $\lambda = S \times N$ b) $\lambda = N / S$

c) $\lambda = S / N$ d) $\lambda = S^2 / N$

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