DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : PHYSICS**
Date : **DPP No. : 3**

Topic :- KINETIC THEORY

1. A gaseous mixture consists of $16g$ of helium and $16g$ of oxygen. The ratio $\frac{C_P}{C_V}$ of the mixture is
   a) 1.4 b) 1.54 c) 1.59 d) 1.62

2. Mean free path of a gas molecule is
   a) Inversely proportional to number of molecules per unit volume
   b) Inversely proportional to diameter of the molecule
   c) Directly proportional to the square root of the absolute temperature
   d) Directly proportional to the molecular mass

3. The value of densities of two diatomic gases at constant temperature and pressure are d_1 and d_2, then the ratio of speed of sound in these gases will be
   a) $d_1 d_2$ b) $\sqrt{d_2/d_1}$ c) $\sqrt{d_1/d_2}$ d) $\sqrt{d_1 d_2}$

4. If the internal energy of n_1 moles of He at temperature 10 T is equal to the internal energy of n_2 mole of hydrogen at temperature 6 T. the ratio of $\frac{n_1}{n_2}$ is
   a) $\frac{3}{5}$ b) 2 c) 1 d) $\frac{5}{3}$

5. The heat capacity per mole of water is (R is universal gas constant)
   a) $9R$ b) $\frac{9}{2}R$ c) $6R$ d) $5R$

6. If number of molecules of H_2 are double than that of O_2, then ratio of kinetic energy of hydrogen and that of oxygen at 300 K is
   a) 1 :1 b) 1 :2 c) 2 :1 d) 1 :16

7. According to the kinetic theory of gases, the temperature of a gas is a measure of average
   a) Velocities of its molecules
   b) Linear momenta of its molecules
   c) Kinetic energies of its molecules
   d) Angular momenta of its molecules

8. Air is filled in a bottle at atmospheric pressure and it is corked at 35°C. If the cork can come out at 3 atmospheric pressure than upto what temperature should the bottle be heated in order to remove the cork
a) 325.5°C b) 851°C c) 651°C d) None of these

9. The temperature at which the average translational kinetic energy of a molecule is equal to the energy gained by an electron in accelerating from rest through a potential difference of 1 $volt$ is
a) $4.6 \times 10^3 K$ b) $11.6 \times 10^3 K$ c) $23.2 \times 10^3 K$ d) $7.7 \times 10^3 K$

10. The average momentum of a molecule in an ideal gas depends on
a) Temperature b) Volume c) Molecular mass d) None of these

11. If pressure of CO_2 (real gas) in a container is given by $P = \frac{RT}{2V - b} - \frac{a}{4b^2}$, then mass of the gas in container is
a) 11 g b) 22 g c) 33 g d) 44 g

12. For an ideal gas of diatomic molecules
a) $C_p = \frac{5}{2}R$ b) $C_v = \frac{3}{2}R$ c) $C_p - C_v = 2R$ d) $C_p = \frac{7}{2}R$

13. What is the value of $\frac{R}{C_P}$ for diatomic gas
a) 3/4 b) 3/5 c) 2/7 d) 5/7

14. When volume of system is increased two times and temperature is decreased half of its initial temperature, then pressure becomes
a) 2 times b) 4 times c) $\frac{1}{4}$ times d) $\frac{1}{2}$ times

15. A vessel of volume 4 L contains a mixture of 8 g of oxygen, 14 g of nitrogen and 22 g of carbon dioxide at 27°C. The pressure exerted by the mixture is
a) 5.79×10^5 Nm^{-2} b) 6.79×10^5 Nm^{-2} c) 7.79×10^3 Nm^{-2} d) 7.79×10^5 Nm^{-2}

16. 2 g of O_2 gas is taken at 27°C and pressure 76 $cm.Hg$. Find out volume of gas (in litre)
a) 1.53 b) 2.44 c) 3.08 d) 44.2

17. When an air bubble of radius $'r'$ rises from the bottom to the surface of a lake, its radius becomes $5r/4$ (the pressure of the atmosphere is equal to the 10 m height of water column). If the temperature is constant and the surface tension is neglected, the depth of the lake is
a) 3.53 m b) 6.53 m c) 9.53 m d) 12.53 m

18. At what temperature will the rms speed of air molecules be double than that at NTP?
a) 519°C b) 619°C c) 719°C d) 819°C

19. The kinetic energy per $g\ mol$ for a diatomic gas at room temperature is

a) $3\ RT$ b) $\frac{5}{2}RT$ c) $\frac{3}{2}RT$ d) $\frac{1}{2}RT$

20. The average kinetic energy of a gas at - 23°C and 75 cm pressure is $5 \times 10^{-14} erg$ for H_2. The mean kinetic energy of the O_2 at 227°C and 150 cm pressure will be

a) $80 \times 10^{-14} erg$ b) $20 \times 10^{-14} erg$ c) $40 \times 10^{-14} erg$ d) $10 \times 10^{-14} erg$