Chapter : KINETIC THEORY

Assignment 2

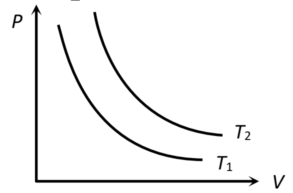
Class 11

DPP
DAILY PRACTICE PROBLEMS

Class : XIth **Subject : PHYSICS**
Date : **DPP No. : 2**

Topic :- KINETIC THEORY

1. The adjoining figure shows graph of pressure and volume of a gas at two temperatures T_1 and T_2. Which of the following inferences is correct



a) $T_1 > T_2$ b) $T_1 = T_2$
c) $T_1 < T_2$ d) No interference can be drawn

2. At room temperature (27°C) the rms speed of the molecules of a certain diatomic gas is found to be 1920 ms^{-1}. The gas is
a) Cl_2 b) O_2 c) N_2 d) H_2

3. At a given temperature, the pressure of an ideal gas of density ρ is proportional to
a) $\frac{1}{\rho^2}$ b) $\frac{1}{\rho}$ c) ρ^2 d) ρ

4. Temperature remaining constant, the pressure of gas is decreased by 20%. The percentage change in volume
a) Increases by 20% b) Decreases by 20% c) Increases by 25% d) decreases by 25%

5. The rms velocity of gas molecules is 300 ms^{-1}. The rms velocity of molecules of gas with twice the molecular weight and half the absolute temperature is
a) 300 ms^{-1} b) 600 ms^{-1} c) 75 ms^{-1} d) 150 ms^{-1}

6. A jar contains a gas and few drops of water at T K. The pressure in the jar is 830 mm of mercury. The temperature of jar is reduced by 1%. The saturated vapour pressure of water at the two temperatures are 30 mm and 25 mm of mercury. Then the new pressure in the jar will be
a) 917 mm of Hg b) 717 mm of Hg c) 817 mm of Hg d) None of these

7. The gas equation $\frac{PV}{T}$ = constant is true for a constant mass of an ideal gas undergoing
a) Isothermal change b) Adiabatic change c) Isobaric change d) Any type of change

8. The pressure and temperature of two different gases is P and T having the volume V for each. They are mixed keeping the same volume and temperature, the pressure of the mixture will be

a) $P/2$ b) P c) $2P$ d) $4P$

9. Vessel A is filled with hydrogen while vessel B, whose volume is twice that of A, is filled with the same mass of oxygen at the same temperature. The ratio of the mean kinetic energies of hydrogen and oxygen is

a) $16 : 1$ b) $1 : 8$ c) $8 : 1$ d) $1 : 1$

10. The root mean square speed of hydrogen molecules at 300 K is 1930 m/s. Then the root mean square speed of oxygen molecules at 900 K will be

a) $1930\sqrt{3}\ m/s$ b) $836\ m/s$ c) $63\ m/s$ d) $\frac{1930}{\sqrt{3}}\ m/s$

11. A cylinder rolls without slipping down an inclined plane, the number of degrees of freedom it has, is

a) 2 b) 3 c) 5 d) 1

12. Two spheres made of same material have radii in the ratio1 : 2. Both are at same temperature. Ratio of heat radiation energy emitted per second by them is

a) 1 : 2 b) 1 : 4 c) 1 : 8 d) 1 : 16

13. If $r.m.s.$ velocity of a gas is $V_{rms} = 1840\ m/s$ and its density $\rho = 8.99 \times 10^{-2} kg/m^3$, the pressure of the gas will be

a) $1.01\ N/m^2$ b) $1.01 \times 10^3 N/m^2$ c) $1.01 \times 10^5 N/m^2$ d) $1.01 \times 10^7 N/m^2$

14. An ideal gas ($\gamma = 1.5$) is expanded adiabatically. How many times has the gas to be expanded to reduce the root mean square velocity of molecules 2.0 times?

a) 4 times b) 16 times c) 8 times d) 2 times

15. The quantity of heat required to raise one mole through one degree kelvin for a monoatomic gas at constant volume is

a) $\frac{3}{2}R$ b) $\frac{5}{2}R$ c) $\frac{7}{2}R$ d) $4R$

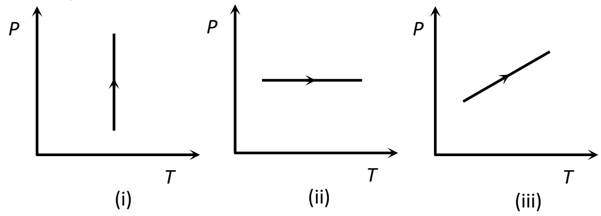
16. Calculate the ratio of rms speeds of oxygen gas molecules to that of hydrogen gas molecules kept at the same temperature.

a) 1:4 b) 1:8 c) 1:2 d) 1:6

17. At constant pressure, the ratio of increase in volume of an ideal gas per degree rise in kelvin temperature to it's original volume is (T = absolute temperature of the gas)

a) T^2 b) T c) $1/T$ d) $1/T^2$

18. Pressure versus temperature graphs of an ideal gas are as shown in figure. Choose the wrong statement



a) Density of gas is increasing in graph (i)
b) Density of gas is decreasing in graph (ii)
c) Density of gas is constant in graph (iii)
d) None of these

19. A body takes 10 min to cool from 60°C to 50°C. If the temperature of surroundings is 25°C and 527°C respectively. The ratio of energy radiated by P and Q is

a) 48°C
b) 46°C
c) 49°C
d) 42.85°C

20. A cylinder of radius r and thermal conductivity K_1 is surrounded by a cylindrical shell of linear radius r and outer radius$2r$, whose thermal conductivity is K_2. There is no loss of heat across cylindrical surfaces, when the ends of the combined system are maintained at temperatures T_1 and T_2. The effective thermal conductivity of the system, in the steady state is

a) $\frac{K_1K_2}{K_1+K_2}$
b) K_1+K_2
c) $\frac{K_1+3K_2}{4}$
d) $\frac{3K_1+K_2}{4}$