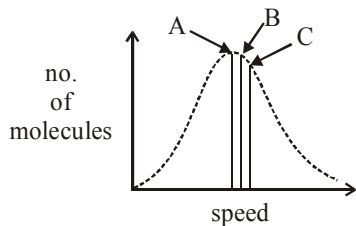


IDEAL GAS

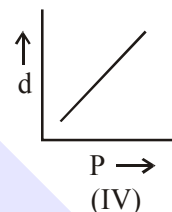
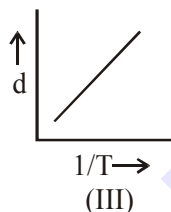
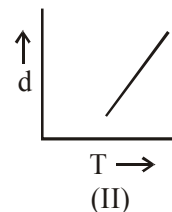
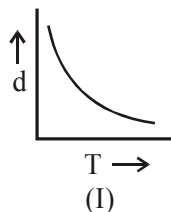
1. Identify the correct labels of A, B and C in the following graph from the options given below:



Root mean square speed (V_{rms}) ; most probable speed (V_{mp}) ; Average speed (V_{av} .)

- (1) A - V_{rms} ; B - V_{mp} ; C - V_{av}
 (2) A - V_{av} ; B - V_{rms} ; C - V_{mp}
 (3) A - V_{mp} ; B - V_{rms} ; C - V_{av}
 (4) A - V_{mp} ; B - V_{av} ; C - V_{rms}
2. A mixture of one mole each of H_2 , He and O_2 each are enclosed in a cylinder of volume V at temperature T. If the partial pressure of H_2 is 2 atm, the total pressure of the gases in the cylinder is :
- (1) 14 atm (2) 22 atm
 (3) 6 atm (4) 38 atm

3. Which one of the following graphs is **not correct** for ideal gas ?



d = Density, P = Pressure, T = Temperature

- (1) II (2) III
 (3) I (4) IV
4. A spherical balloon of radius 3 cm containing helium gas has a pressure of 48×10^{-3} bar. At the same temperature, the pressure, of a spherical balloon of radius 12 cm containing the same amount of gas will be $____ \times 10^{-6}$ bar.

SOLUTION**1. NTA Ans. (4)**

Sol.
$$V_{mp} \left(= \sqrt{\frac{2RT}{M}} \right) < V_{av} \left(= \sqrt{\frac{8RT}{\pi M}} \right) < V_{rms} \left(= \sqrt{\frac{3RT}{M}} \right)$$

2. Official Ans. by NTA (3)**Sol.** According to Dalton's law of partial pressure

$$p_i = x_i \times P_T$$

 p_i = partial pressure of the i^{th} component x_i = mole fraction of the i^{th} component p_T = total pressure of mixture

$$\Rightarrow 2 \text{ atm} = \left(\frac{n_{\text{H}_2}}{n_{\text{H}_2} + n_{\text{H}_e} + n_{\text{O}_2}} \right) \times p_T$$

$$\Rightarrow p_T = 2 \text{ atm} \times \frac{3}{1} = 6 \text{ atm}$$

3. Official Ans. by NTA (1)

Sol. $PM = dRT \Rightarrow d \propto \frac{1}{T}$

4. Official Ans. by NTA (750.00)