**126.(2)** At same P & T

$n \propto V$

$\therefore \quad \frac{n_1}{n_2} = \frac{V_1}{V_2} \Rightarrow \frac{3}{3.1} = \frac{60}{V_2} \Rightarrow V_2 = 62L$

$\therefore$ Change in vol. = 2L

**127.(9)** At constant P & n,

$V \propto T$

$\Rightarrow$ % change in V = % change in T

% change in $T = \frac{9}{100} \times 100 = 9\%$

$\therefore$ a = 9

**128.(3)** Let the volume of bulb be V L

$\therefore$ At 300K, Volume of gas = V L

At 500K, Volume of gas becomes $(V+2)L$

At constant P & n,

$\frac{500}{300} = \frac{V+2}{V} \Rightarrow V = 3L$

**129.(4)** At constant V & T,

$P \propto n$

As $P_2 / P_1 = n_2 / n_1 = 2/8$

$\Rightarrow \quad \frac{n_2}{n_1} = \frac{1}{4}$

$\therefore \quad \frac{\text{Initial mass}}{\text{Final mass}} = 4:1$

**130.(8)** Let the volume of $CH_4$ leaked in 2 sec be x mL $\frac{\text{Rate of effusion of He}}{\text{Rate of effusion of } CH_4} = \frac{P_{He}}{P_{CH_4}}\sqrt{\frac{M_{CH_4}}{M_{He}}}$

$\Rightarrow \quad \frac{16/4}{x/2} = \frac{1}{2}\sqrt{\frac{16}{4}} \Rightarrow x = 8\,mL$

**131.(4)** Let the no. of molecules moving with

Speed of $3\,ms^{-1}$ be $n_1$

Speed of $7\,ms^{-1}$ be $n_2$

So, $n_1 + n_2 = 10$

Also, $C_{rms} = \sqrt{\frac{n_1C_1^2 + n_2C_2^2}{n_1 + n_2}} = 5$

$\Rightarrow \quad 9n_1 + 49n_2 = 25n_1 + 25n_2$

$\Rightarrow \quad n_1 = \frac{3}{2}n_2$

or, $n_1 = 6$ & $n_2 = 4$

**132.(4)** $\frac{r_{CH_4}}{r_{M(CO)_x}} = \sqrt{\frac{63.29 + 28x}{16}}$

$\Rightarrow \quad 3.31 = \sqrt{\frac{63.29 + 28x}{16}}$

Solving for x, we get

$x \simeq 4$

**133.(3)** Vapour density $= \frac{\text{Mol.wt.}}{2}$

$\therefore \quad$ Mol. Wt. of $O_n = 48$ gm/mol

$\Rightarrow \quad n = 3$

**134.(6)** Let the Mol. Wt. of substance be $M_O$ g/mol

$\therefore \quad \frac{\text{Rate of effusion of substance}}{\text{Rate of effusion of } O_2} = \sqrt{\frac{32}{M_0}}$

$\Rightarrow \quad (0.4216)^2 = \frac{32}{M_o}$

$\Rightarrow \quad M_o = 180\,g / mol$

As density of substance = 0.3 g/L

$\therefore \quad$ Vol. of 1 mole $= \frac{180g / mol}{0.3g / L} = 600L$

or, $6 \times 10^2$ L

So, a = 6

**135.(2)** At constant P & V,

$n_1T_1 = n_2T_2$

$\Rightarrow \quad n_1 \times 300K = n_2 \times 600K$

$\Rightarrow \quad \frac{n_1}{n_2} = \frac{2}{1}$

**136.(4)** Since final pressure $= \frac{1}{2}$ Initial pressure

$\therefore \quad n_{A_3O_n} = 1\,\text{mole}$

$\Rightarrow \quad$ no. of moles of $O_2$ in $A_3O_n = \frac{n}{2}$

no. of moles of $O_2$ initially taken = 2

$\Rightarrow \quad \frac{n}{2} = 2 \Rightarrow n = 4$

**137.(4)** $PV_m = Pb + RT$ (at high pressures)

For the plot between $PV_m$ vs P,

Intercept = RT = 22.16 L – atm

$\therefore \quad 0.08 \times T = 22.16\,L - atm$

$\Rightarrow \quad T = 277K \text{ or } 4°C$

**138.(2)** When the two boxes A & B interconnected, the pressure in both the boxes become same.

$\therefore \quad P \times V_A = n_A \times R \times 300$

$P \times 4V_A = n_B \times R \times 600$

$\Rightarrow \quad \frac{V_A}{4V_A} = \frac{n_A}{n_B} \times \frac{300}{600}$

$\Rightarrow \quad \frac{n_B}{n_A} = \frac{2}{1}$

**139.(3)** Density of vapours = 0.36 g/L

Molar mass of vapours = 18 g/mol

$\therefore \quad \text{Molar volume} = \frac{\text{Molar Mass}}{\text{Density}}$

$\Rightarrow \quad \text{Molar volume} = \frac{18\,g\,mol^{-1}}{0.36\,g / L} = 50\,L\,mol^{-1}$

$\therefore$ Molar volume is 5000 $m^3$ or $5 \times 10^3\,m^3$

So, value of a = 3

**140.(4)** $\mu_{rms} = \sqrt{\frac{3RT}{M}}$

$\therefore \quad \mu_{rms} \propto \sqrt{T} \propto \sqrt{P}$ (at constant V & n)

$\therefore$ Pressure increases by 4 times

So, $\frac{P_f}{P_i} = \frac{4}{1}$