Ideal Gas

(38)

$$\frac{r_{mix}}{r_{SO_2}} = 2 = \sqrt{\frac{64}{M_{mix}}}$$
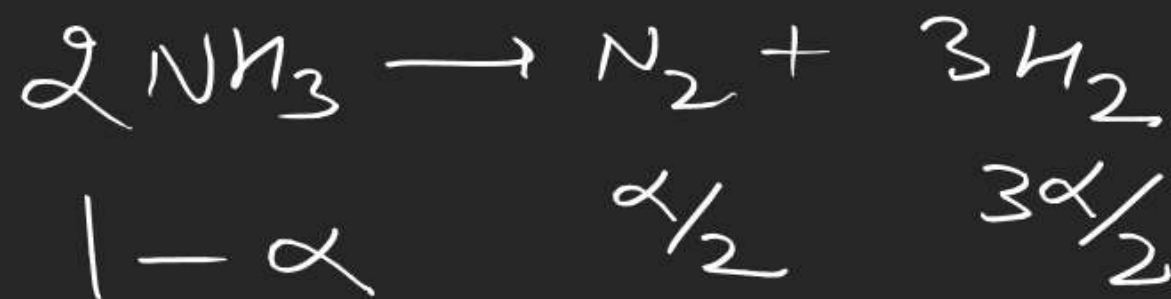
$$M_{mix} = \frac{64}{4} = 16$$
$$(M_{avg})$$

$$Upto \ 29$$

$$2NH_3 \longrightarrow N_2 + 3H_2$$
$$1-\alpha \qquad \alpha/2 \qquad 3\alpha/2$$

$$\boxed{16 = \frac{17}{1+\alpha}}$$

Ideal Gas

S-I Upto 29

(27) 2 atm ⟶ ½ atm

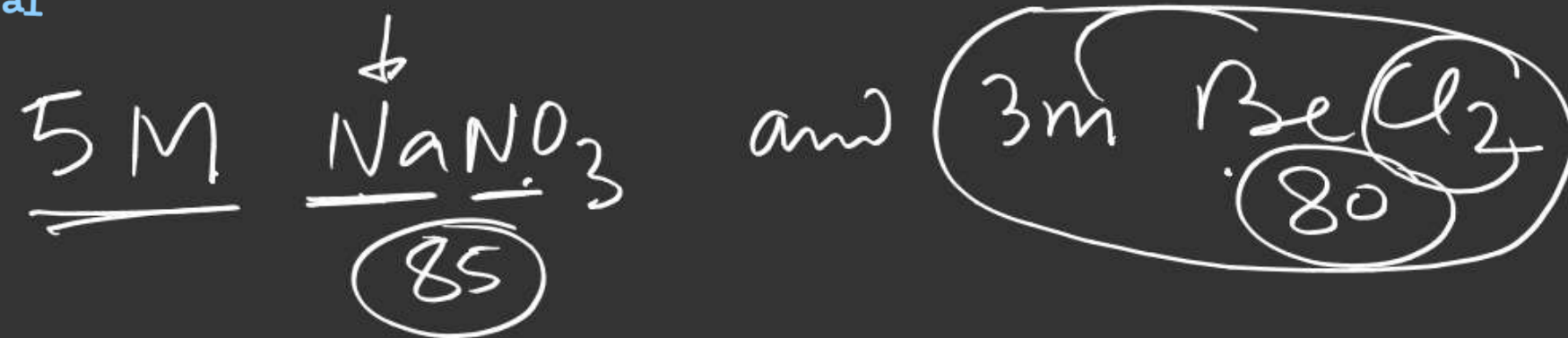(23)

$$\frac{100}{n_{N_2}} = \sqrt{\frac{28}{M_{SF_6}}}$$

$$\frac{n/t_{H_2}}{n/t_{N_2}} = \sqrt{\frac{28}{2}}$$

(28) (111)

$$\frac{n_{SO_2}}{n_{CH_4}} = \frac{8}{1}\left(\sqrt{\frac{16}{64}}\right)^3 = \frac{1}{1}$$

$$\frac{r_{SO_2}}{r_{CH_4}} = \frac{1}{1}\sqrt{\frac{16}{64}}$$

$$= \frac{1}{2}$$

$$5M \quad \underset{\underset{(85)}{|}}{NaNO_3} \quad \text{and} \quad 3m \ BeCl_2 \atop (80) \qquad d = 1.665 \ gm/ml$$

Solvent : H_2O

$\longrightarrow$ 1000 ml solution contains 5mol $NaNO_3$

1665 gm solution $\parallel$ $5 \times 85 = 425$ gm $NaNO_3$

$$W_{\underset{1240-x}{H_2O}} + \underset{x \ gm}{\overset{\downarrow}{\underset{\overline{}}{BeCl_2}}} = 1665 - 425$$

$$= 1240 \ gm$$

molality of $= 3 = \dfrac{x/80}{1240-x} \times 1000$
$BeCl_2$

$$x = 240 \ gm$$
$$= \underline{3 \ moles}$$

$$\underline{[BeCl_2] = 3M}$$

Ideal Gas

K T G :→

③ Gaseous molecules move randomly in all directions.

e.g. shows brownian motion

There is no effect of gravity on molecules.

because gases do not settle down.

④ Molecules moves in straight path in betn the collision

And collision betn molecules and with the wall of container are elastic in nature. Total Kinetic energy remains constant.

⑤ Pressure exerted by the molecules is due to the <u>collision</u> betⁿ molecules and wall of the container
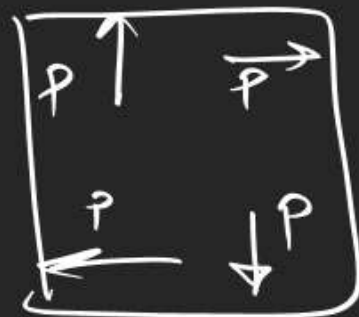
⑥ Molecules move with different speed in a container and speed may change due to collisions

$100 - 200$ $\boxed{n_1}$

$200 - 300$ n_2

$300 - 400$ n_3

No of particles moving in a range of speed remain same at a given temperature

Ideal Gas

⑦ Kinetic energy of gas depends only on temperature. $KE = f(T)$

Maxwell distribution of Molecular speed :→

It is based on the fact that no. of molecules in a given speed range are const

$$N = \int dN = \int 4\pi N \left(\frac{M}{2\pi RT}\right)^{3/2} e^{-\frac{Mu^2}{2RT}} u^2 \, du$$

$N =$ Total number of molecules

$M =$ Molar mass , $T =$ temp

$dN =$ no. of molecule having speed bet^n u to $u + du$

$$dN_1 \longrightarrow U_1 \boxed{+ dy}$$

$$dN_2 \longrightarrow U_2$$

$$dN_3 \longrightarrow U_3$$

$$\underline{U_{avg}} = \frac{dN_1 \times U_1 + dN_2 \times U_2 ---\!-}{dN_1 + dN_2 + \sim \cdots}$$

$$= \frac{\int_0^\infty dN \times U}{N} = \boxed{\sqrt{\frac{8RT}{\pi M}} = U_{avg}}$$

$$U_{rms} = \sqrt{\frac{dN_1 \times u_1^2 + dN_2 \times u_2^2 - - -}{\boxed{dN_1 + dN_2}}}$$

root of mean
of
of square speed

$$= \left[\frac{\int dN \times u^2}{N}\right]^{1/2}$$

$$\boxed{U_{rms} = \sqrt{\frac{3RT}{M}}}$$

$$U_{avg} = \sqrt{\frac{8RT}{\pi M}}$$

Q. find U_{rms} of $\boxed{H_2}$ at $\underline{300\ K}$

$$U_{rms} = \sqrt{\frac{3RT}{M}} = \sqrt{\frac{3 \times \boxed{8.314} \times 300}{\boxed{2 \times 10^{-3}}}} = \sqrt{\frac{3 \times 25/3 \times 300}{2 \times 10^{-3}}}$$

$$= \sqrt{\frac{750}{2} \times 10^4} = \sqrt{375 \times 10^2}$$

$$= 19.32 \times 10^2$$

$$= \underline{1932\ m/sec} = 1932 \times \frac{18}{5}\ km/hr$$

Ideal Gas

1mm

$$= \frac{5 + 6 + 8}{3}$$

$$(5 \times 6 \times 8)^{1/3}$$

$$\sqrt{\frac{5^2 + 6^2 + 8^2}{3}}$$

$$PV = nRT$$

$$0 - \mathbb{I}$$

$$4 - 6$$

$$5 - \mathbb{I} \qquad 1 - 6$$