Nishant Jindal

Ideal Gas

(60)

$$Z_{11} \propto \frac{P^2}{T^{3/2}}$$

$$\propto \frac{P^2}{P^{3/2}}$$

$$\propto \sqrt{P}$$

(25)

19 cm

He	O_2	SO_2
64gm	64gm	64gm
16 mol	2 mol	1 mol
16 cm	2 cm	1 cm

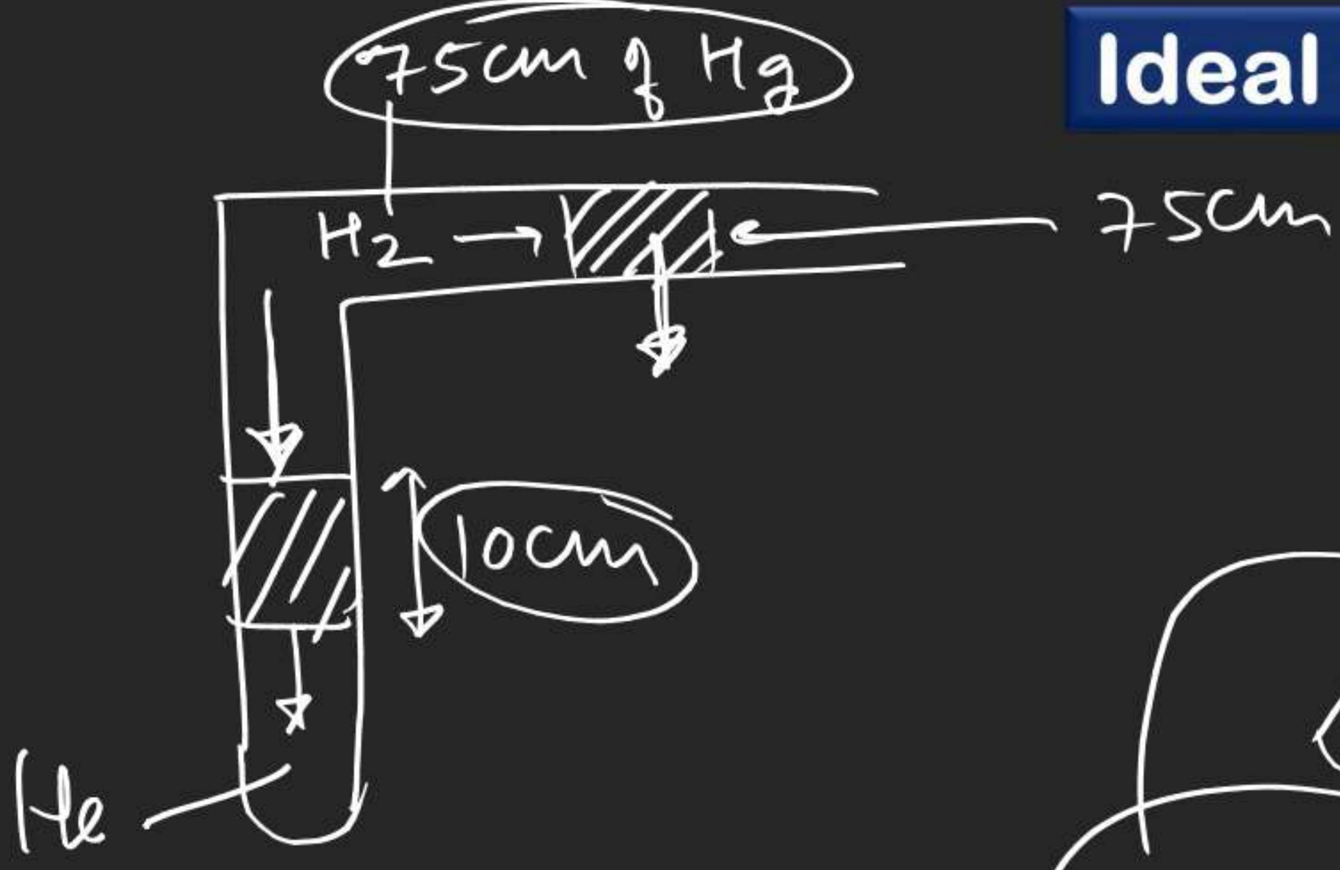
2cm

10atm

$P_1 l_1 = P_2 l_2$

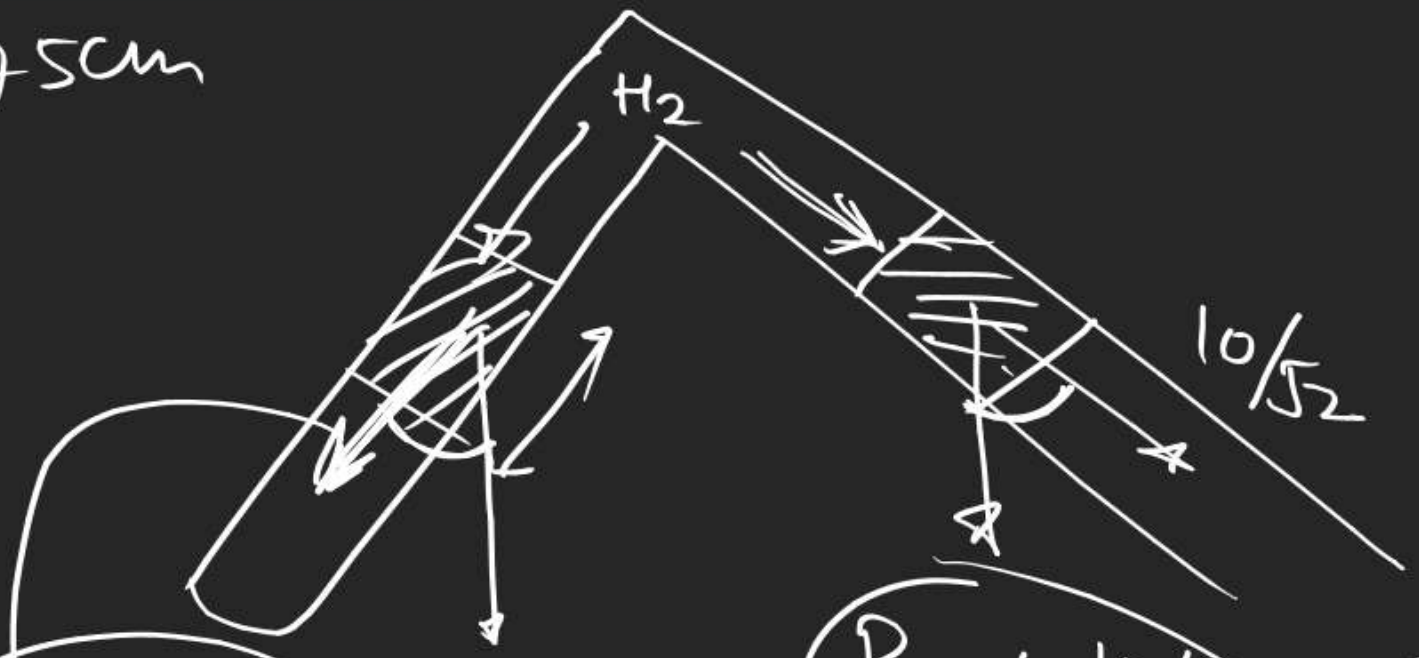
20atm

26



$P_{He} = 75 + 10$

$= 85$



$P_{H_2} + 10/\sqrt{2} = P_{He}$

$P_{H_2} + 10/\sqrt{2} = 75$

mg

$h d g \cos\theta$

$P_{He} = 75$

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Ideal Gas

S–I

30

$$1\,eV = 1.6\times10^{-19}\ \text{Joule}$$

$$KE_{,\text{molecule}} = \frac{3}{2}kT = \frac{3}{2}\frac{R}{N_A}T$$

$$= \frac{\frac{3}{2}\times\frac{8.314}{6.022\times10^{23}}\times 300\ \text{Joule}}{1.6\times10^{-19}}$$

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Ideal Gas

34

$$\begin{array}{ccccc} A & & B & & C \\ \sqrt{\dfrac{\cancel{2}R(200)}{2}} & : & \sqrt{\dfrac{\cancel{2}R \times 400}{16}} & : & \sqrt{\dfrac{\cancel{2}R \ \cancel{1600}\,100}{\cancel{64}\ 4}} \end{array}$$

$$10 : 5 : 5$$

$$2 : 1 : 1$$

$$x \quad y \quad z$$

Ideal Gas

37

$$\boxed{\lambda = \frac{TK}{\sqrt{2}\pi\sigma^2 P}} = \frac{300 \times 8.314/N_A}{\sqrt{2} \times 22/7 \times (460 \times 10^{-12}\,m)^2 \times \frac{10^{-6} \times 1.01325 \times 10^5}{760}}$$

4

CH_4 — 32 gm — 2 mol

O_2 — 32 gm — 1 mol

$$P_{O_2} = X_{O_2} P_T$$

$$\frac{P_{O_2}}{P_T} = \frac{1}{1+2}$$

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Ideal Gas

7

3

$$\frac{313}{293}$$

13

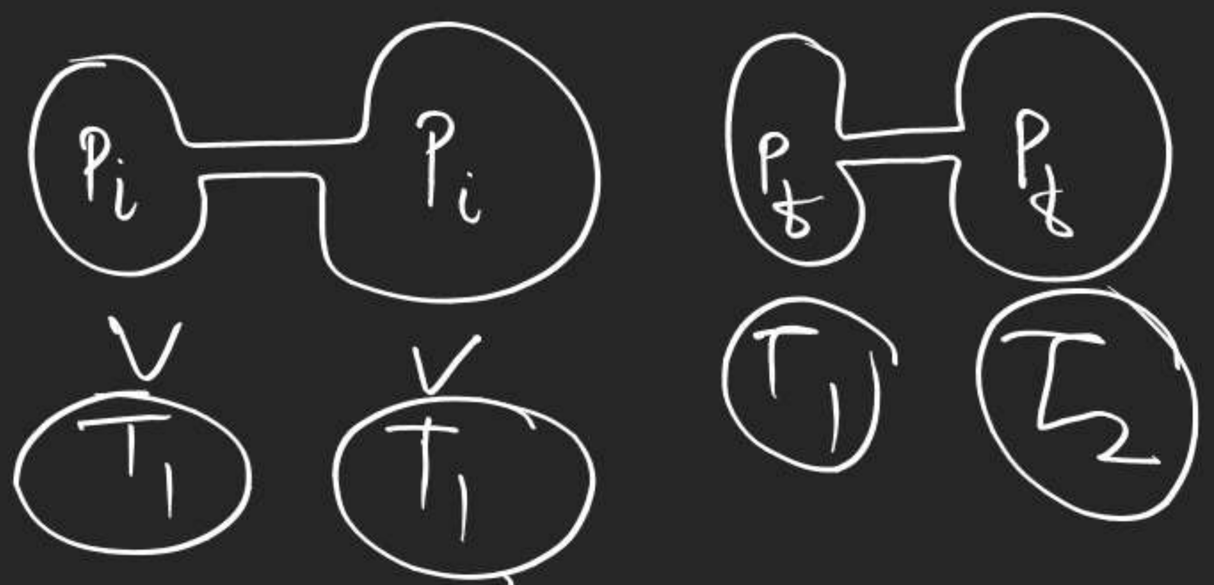
$$V.D = \frac{\text{Mol. mass}}{2}$$

$$16 = \frac{\text{Mol. mass}}{2}$$

20 hold

$$v_{mps} : v_{avg} : v_{rms}$$

12



$$\frac{P_i \cancel{V}}{\cancel{R} T_1} \times 2 = \frac{P_f \cancel{V}}{\cancel{R}}\left(\frac{1}{T_1} + \frac{1}{T_2}\right)$$

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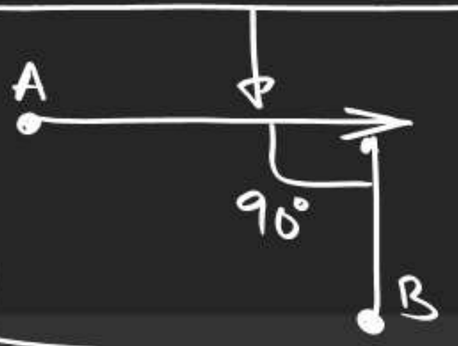
Volume $= \pi\sigma^2 U_{rel}$

Z_{12}

or

Z_{AB}

$\sigma = r_A + r_B$



$$U_{rel} = \sqrt{U_A^2 + U_B^2}$$

$$= \sqrt{\frac{8RT}{\pi}\left(\frac{1}{M_A} + \frac{1}{M_B}\right)}$$

no. of collisions made by 1 molecule of A with B in 1 sec $= \pi\sigma^2 U_{rel} N_B^*$

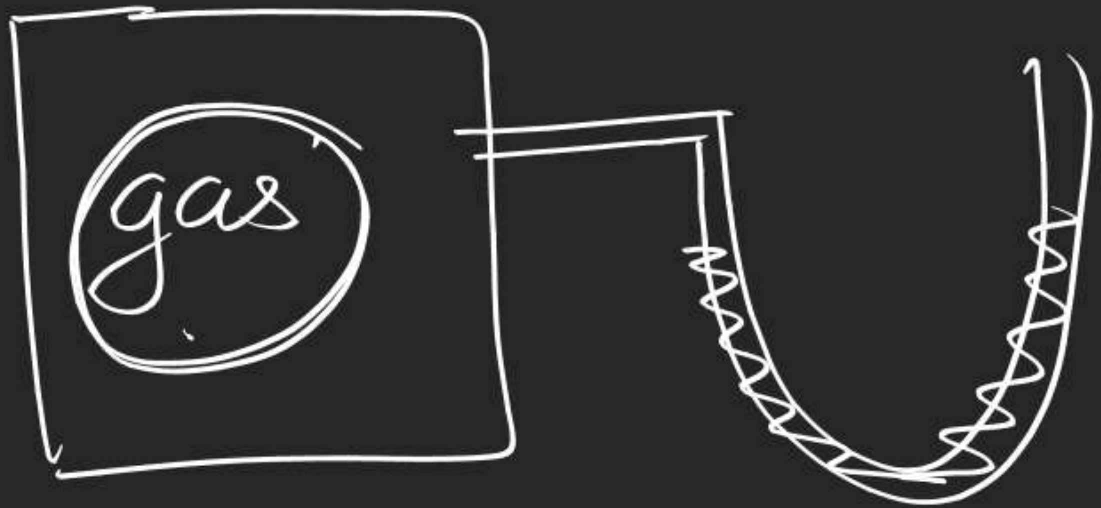
No. of collision made by N_A molecule of A with B in 1 sec per unit volume $= \pi\sigma^2 U_{rel} N_B^* \frac{N_A}{V} = \boxed{\pi\sigma^2 U_{rel} N_A^* N_B^* = Z_{AB}}$

= per sec no. of collision betn A & B per unit volume

Real Gas

$PV = nRT$

P_{theo}



Exp

P_{ext}

Gases

Ideal gas which obey $PV = nRT$ eqn

Real gas don't obey $PV = nRT$

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Vander Waal's equation for real gas :→

Cause of deviation

1.) Size of gaseous molecule is considered negligible which is incorrect as per V.W.

2) As per V.W Intermolecular forces can not neglected which are neglected in KTG.

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~~Ideal Gas~~

following two modification are suggested by V. W in $PV = nRT$ eqn to compensate the error caused by above to assumptions.

(I) Volume correction (II) Pressure correction