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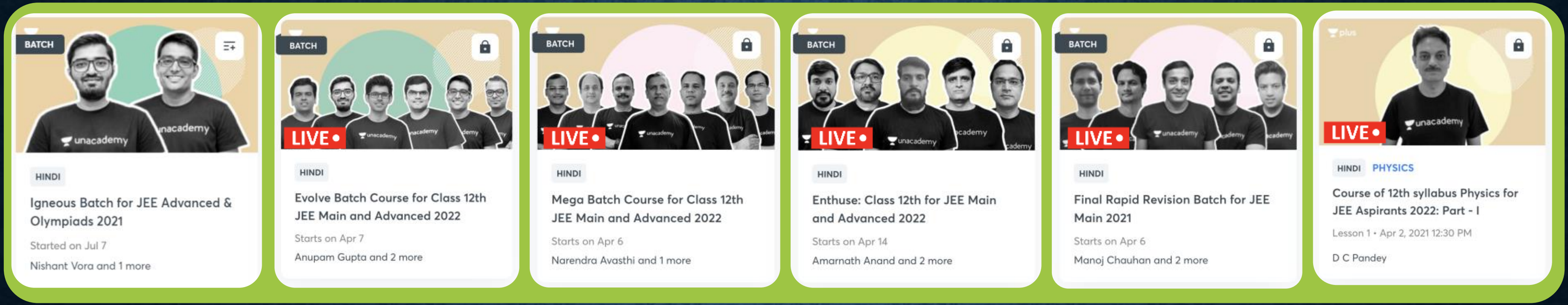

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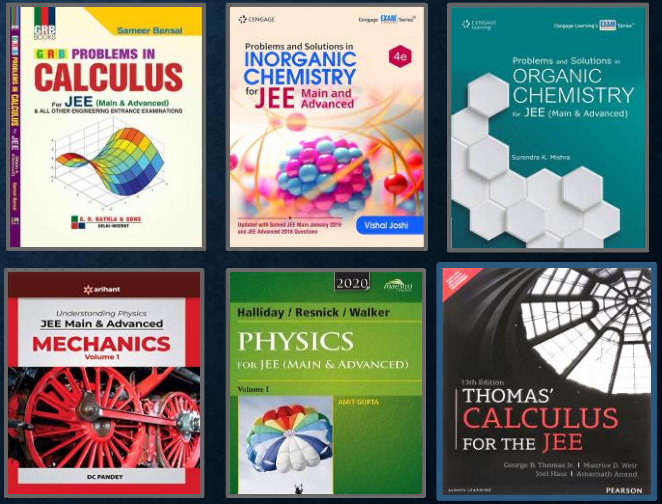

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for IIT JEE Main and Advanced 2024

Code: SAKSHI

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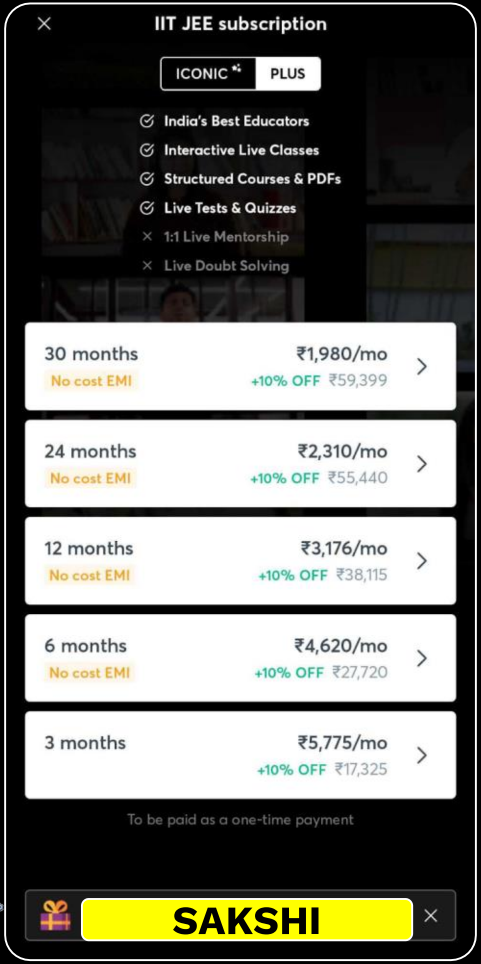
Chemistry Maestro

Megha Khandelwal
Chemistry Maestro



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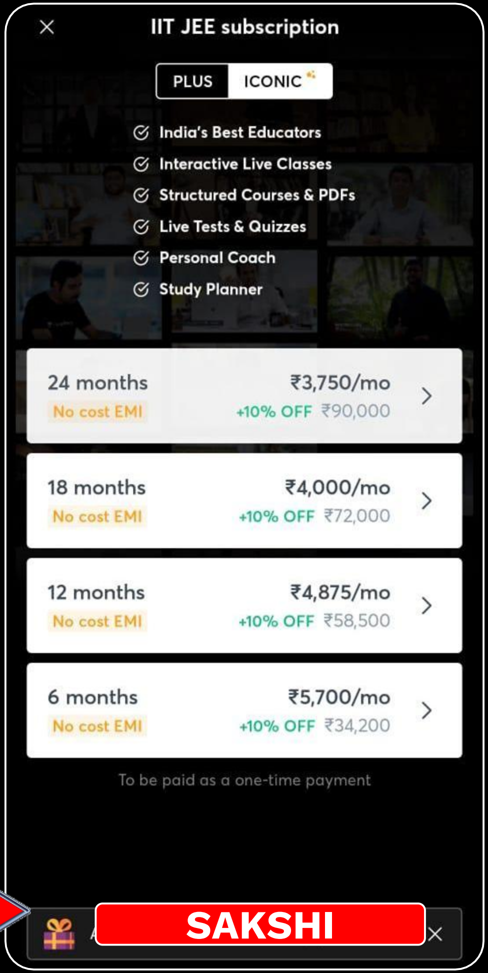

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1. At 300 K, a sample of 3.0 g of gas A occupies the same volume as 0.2 g of hydrogen at 200 K at the same pressure. The molar mass of gas A is _ g mol^{-1} (nearest integer) Assume that the behaviour of gases as ideal. (Given : The molar mass of hydrogen (H_2) gas is 2.0 g mol^{-1})

JEE Main PYQ

A: 300 K, 3 g, Vol = V, Press = P

H_2: 0.2 g, 200 K, Vol = V, Press P

A = ?

A = nRT   B = nRT

$nRT = nRT$

$\frac{3}{mm} \times 300 = \frac{0.2}{2} \times 200$

mm = 45 g/mol

2. A rigid nitrogen tank stored inside a laboratory has a pressure of 30 atm at 06:00 am when the temperature is 27 °C. At 03:00 pm, when the temperature is 45°C, the pressure in the tank will be_ atm. [nearest integer]

JEE Main PYQ

6 am → 3pm

N_2

$PV = nRT$

$\frac{P}{T} = \text{const}$

$P = 30$ atm

$T = 27 + 273 = 300$ K

$P = ?$

$T = (273 + 45)$ K

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{30}{300} = \frac{P_2}{318}$$

3. An evacuated glass vessel weighs 40.0 g when empty, 135.0 g when filled with a liquid of density 0.95 g mL^{-1} and 40.5 g when filled with an ideal gas at 0.82 atm at 250 K. The molar mass of the gas in g mol^{-1} is :

(Given : R = 0.082 L atm K^{-1} mol^{-1})

JEE-PYQ

A. 35

B. 50

C. 75

D. 125

40g खाली

liq — 135g, $d = 0.95 g mL^{-1}$

$m_{liq} = (135 - 40)$ g $= 95$ g

$d = \frac{m}{v}$

$v = \frac{m}{d} = \frac{95 g}{0.95 g mL^{-1}} = 100 mL$

40.5g

P = 0.82 atm

T = 250 K

mm = ?

V = 100 mL

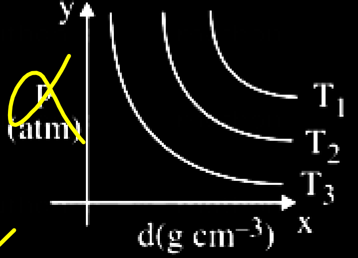
PV = nRT

$\left(\frac{100}{1000}\right)(0.82) = \frac{0.5}{mm} \times 0.0821 (250)$

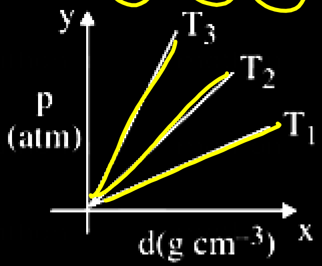
mm = 125

4. Which amongst the given plots is the correct plot for pressure (p) vs density (d) for an ideal gas ?

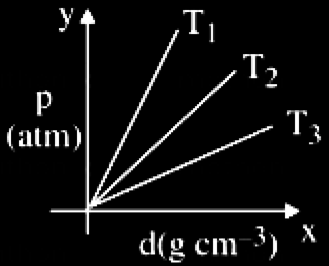
(A) $T_3 > T_2 > T_1$



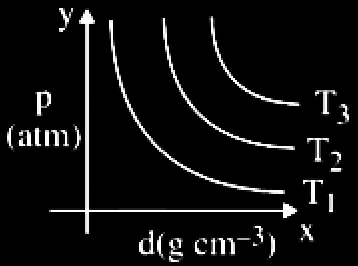
(B) $T_3 > T_2 > T_1$



(C) $T_3 > T_2 > T_1$



(D) $T_3 > T_2 > T_1$



$d = \frac{PM}{RT}$

$\frac{PM}{RT} = d$

$P = \frac{RT}{M} d$

$y = m\ x$

slope $= m = RT$

5. 100 g of an ideal gas is kept in a cylinder of 416 L volume at 27°C under 1.5 bar pressure. The molar mass of the gas is_ g mol^{-1}. (Nearest integer) (Given : R = 0.083 L bar K^{-1} mol^{-1})

JEE PYQ → 2022

Ideal $PV = nRT$

100g
$m = ?$

416 l

T = 300k
P = 15bar

$$15\ bar \times 416\ l = \left(\frac{100}{m}\right) \times 0.083\ l\ bar\ K^{-1}\ mol^{-1} \times 300\ K$$

6. The pressure of a moist gas at 27°C is 4 atm. The volume of the container is doubled at the same temperature. The new pressure of the moist gas is 22 X 10^{-1} atm. (Nearest integer)

(Given : The vapour pressure of water at 27°C is 0.4 atm)

JEE Main 2022

300 K

moist gas

T.P = 4 atm

$P_{H_2O} = 0.4$ atm

$P_g + P_{H_2O} = 4$

$P_g = 4 - 0.4$

$= 3.6$ atm

T = 300 K

V = V

Vol = 2V

T = 300 K

$PV = PV$

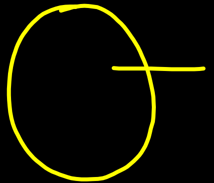
$3.6\,V = x \cdot 2V$

$x = 1.8$ atm

moist gas → new pressure

$1.8 + 0.4 = 2.2$ atm

7. A sealed flask with a capacity of 2 dm^3 contains 11 g of propane gas. The flask is so weak that it will burst if the pressure becomes 2 MPa. The minimum temperature at which the flask will burst is _C°. [nearest integer] (Given : R = 8.3 JK^{-1} mol^{-1}. Atomic masses of C and H are 12u and 1u respectively.) (Assume that propane behaves as an ideal gas.)



$2\,dm^3 = V$

11g

$C_3H_8(g)$

$P = 2 \times 10^6\,Pa$

$T = ?$

$$PV = nRT$$

$$2 \times 10^6\,Nm^{-2} \; 2\,dm^3 = \frac{11}{MM_{C_3H_8}} \times 8.3\,JK^{-1}mol^{-1} \times T$$

$dm^3 \rightarrow m^3$, $T \rightarrow K$

8. A mixture of hydrogen and oxygen contains 40% hydrogen by mass when the pressure is 2.2 bar. The partial pressure of hydrogen is bar. (Nearest integer)

100g

H_2 and O_2 → TP = 2.2 bar

40g (H_2), 60g (O_2)

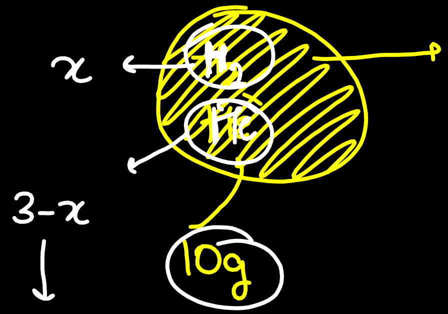
$40\% \rightarrow \frac{40}{100} \times 100$

$$PP_{H_2} = T.P \times x_{H_2}$$

$$= (2.2\,bar)\left(\frac{n_{H_2}}{n_{H_2} + n_{O_2}}\right)$$

$$\Rightarrow (2.2\,bar)\left(\frac{\frac{40}{2}}{\frac{40}{2} + \frac{60}{32}}\right)$$

9. A 10 g mixture of hydrogen and helium is contained in a vessel of capacity 0.0125 m^3 at 6 bar and 27°C. The mass of helium in the mixture is _g. (nearest integer)
Given : R = 8.3 JK^{-1} mol^{-1} (Atomic masses of H and He are 1u and 4u, respectively)



$V = 0.0125\ m^3$

$P = 6\ bar$

$T = 300K$

$PV = nRT$

$6\ bar \times 0.0125\ m^3 = n \times 8.3\ JK^{-1} mol^{-1} \times 300K$

$1m^3 = 1000\ l$

$n_{total} = 3$

2 mole

8g

$10g = x(2) + (3-x)(4)$

$10 = 2x + 12 - 4x$

$-2 = -2x$

$x = 1$ mole

10. Given below are two statements. One is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : Activated charcoal adsorbs SO_2 more efficiently than CH_4.

Reason A : Gases with lower critical temperatures are readily adsorbed by activated charcoal.

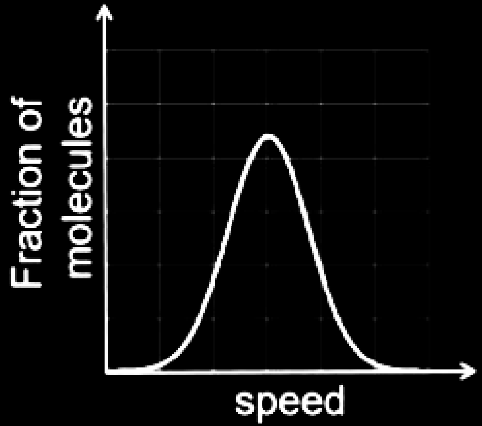
In the light of the above statements, choose the correct answer from the options given below

A. Both A and R are correct and R is the correct explanation of A.
B. Both A and R are correct but R is NOT the correct explanation of A.
C. A is correct but R is not correct.
D. A is not correct but R is correct.

11. for a real gas at 25ºC temperature and high pressure (99 bar) the value of compressibility factor is 2, so the value of vander waal's constant 'b' should be _ x 10^{-2} L mol^{-1} (nearest integer) (given R = 0.083 L bar K^{-1} mol^{-1})

12.

If the distribution of molecular speeds of a gas is as per the figure shown below, then the ratio of the most probable, the average, and the root mean square speeds, respectively, is

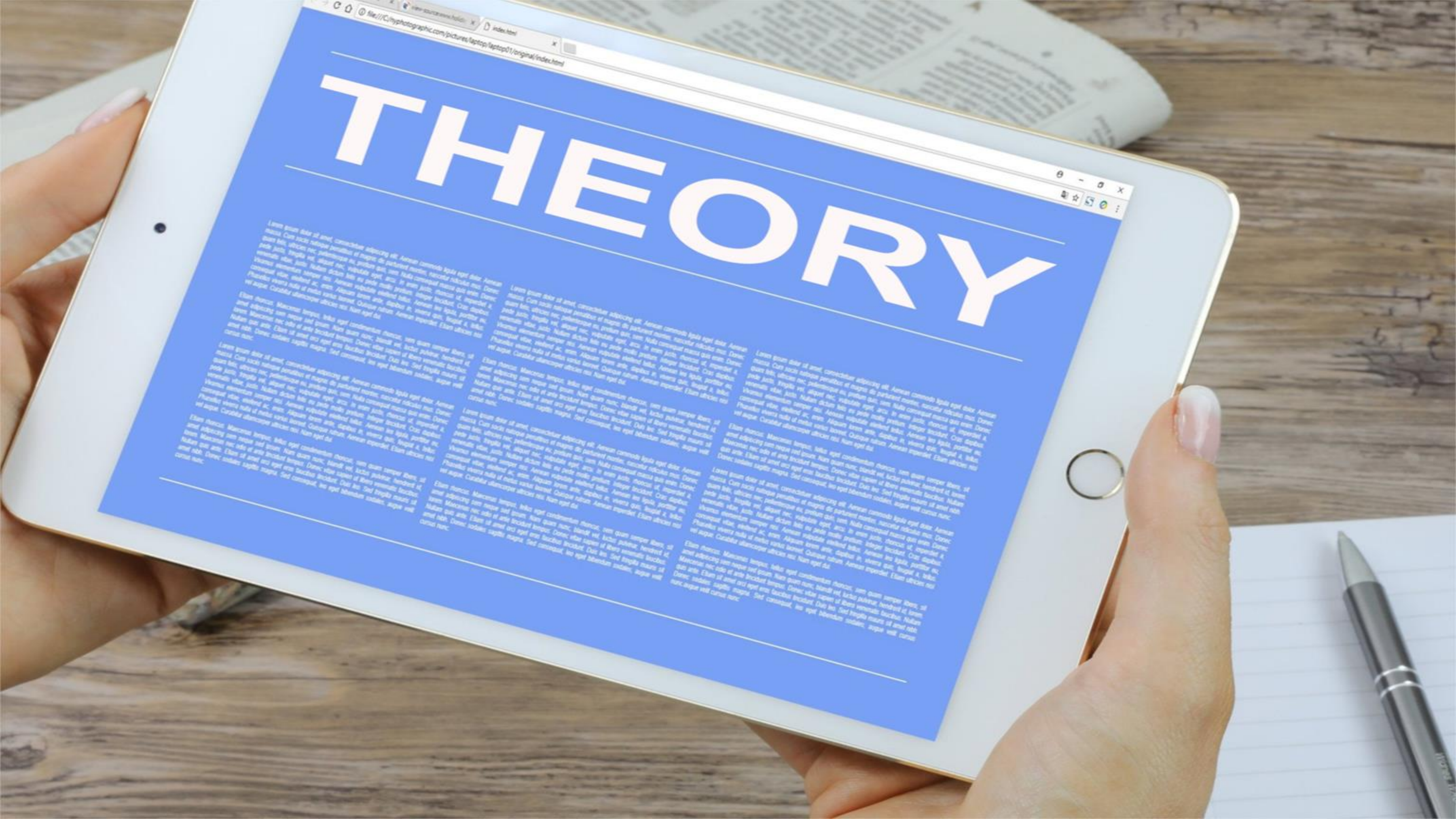


(A) 1 : 1 : 1

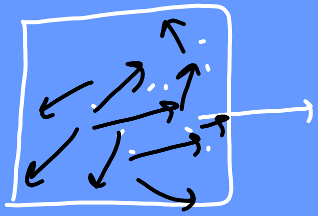
(B) 1 : 1 : 1.224

(C) 1 : 1.128 : 1.224

(D) 1 : 1.128 : 1


THEORY

Gaseous State



any gas O_2, Ne, Ar, He, CO_2, CH_4 etc
(कितनी)

① amount of gas ⓝ $= \frac{Gm}{mm}$

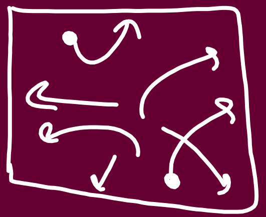
② Temperature of the gas

°C → (K)
273.15

③ <u>volume occupied by gas</u>

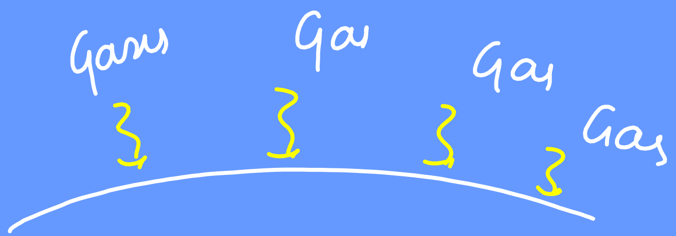
$V_{gas} = V_{container}$

④ <u>Pressure of the gas</u> (P)



every particles exerts same pressure
uniform pressure

(5) atmospheric pressure (atm)

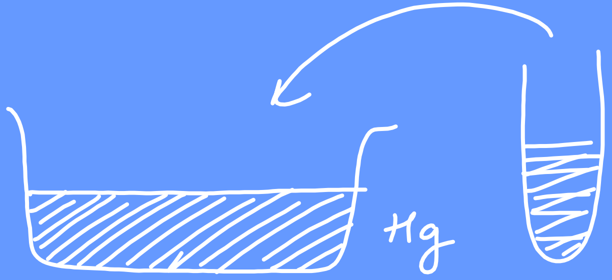


$$\frac{\text{force}}{\text{surface area}} = P_{atm}$$

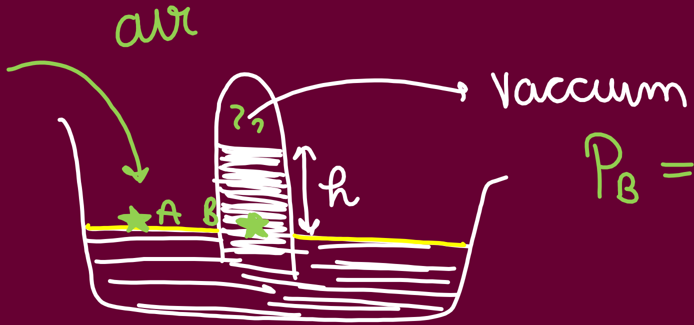
Std pressure = 1 atm

$= 101325\ Nm^{-2}$

⑥ Barometer



$P_A = P_{atm}$



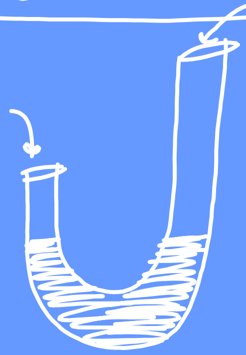
$P_B = h\rho g$

$P_A = P_B$

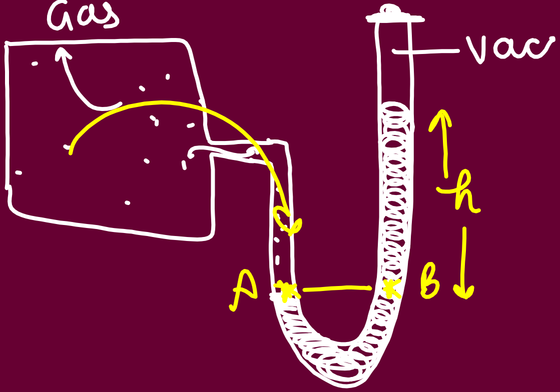
$$P_{atm} = h\rho g$$

$h = 76$ cm Hg

7 Manometer.



closed end manometer



$P_A = P_{gas}$

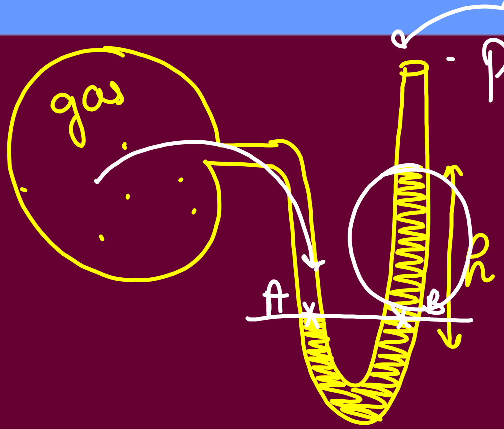
$P_B = h\rho g + 0$

$P_A = P_B$

$$\boxed{P_{gas} = h\rho g}$$

⑧ open end manometer

$P_{gas} = ?$



$P_{gas} = ?$

$P_A = P_{gas}$

$P_B = h\rho g + P_{atm}$

$P_A = P_B$

$h\rho g + P_{atm} = P_{gas}$

Ideal Gas

Gas laws

① Boyle's law :

$n, T \rightarrow$ constant

$P \propto \frac{1}{V}$

$P\uparrow \; V\downarrow$

$P\downarrow \; V\uparrow$

$PV = \text{constant}$

$P_1V_1 = P_2V_2$ & ______

रट्टा तरीका

Ideal gas: $PV =$ ~~nRT~~

~~Boyle~~ Boil ~~Tea~~ T

$VP = k$

$P = \frac{k}{V} \Rightarrow P \propto \frac{1}{V}$

② Charle's Law

n & P → constant

$V \propto T$ → Kelvin

$\frac{V}{T}$ = constant

$\frac{V_1}{T_1} = \frac{V_2}{T_2} = \frac{V_3}{T_3}$ - - -

रट्टा तरीका

V = T (C.P)

Charle's $V \propto T$

③ Gay-Lussac's law.

$V, n \rightarrow$ const

$P \propto T$ (Kelvin)

$$\frac{P}{T} = k = \text{const}$$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2} \text{ \& so on}$$

$P \propto T$

④. Avogadro's law

$P, T \rightarrow$ const

$$V \propto n$$

$\frac{V_1}{n_1} = \frac{V_2}{n_2}$ & so on.

रट्टा

~~P~~V = n~~RT~~

$V \propto n$

Gay-Lussac's

(HW)

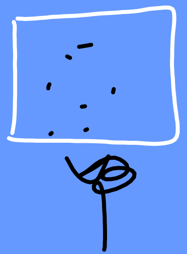
→ $V = \text{const}$

$PV = nRT$

$P \propto T$

T↑

P↑



Avogadro

(HW)

Charle's law

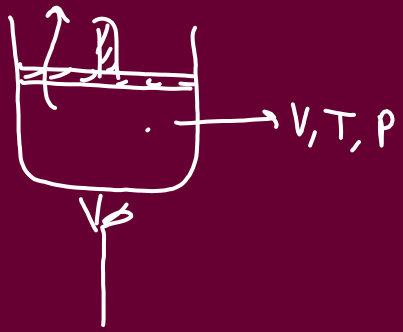
P, n → const

$PV = nRT$

$V \propto T$

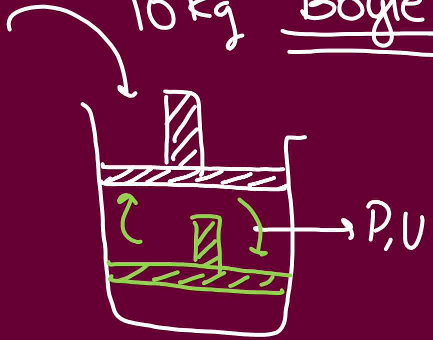
T↑

V↑



Boyle

10 kg



n, T → const

$P \propto \frac{1}{V}$

P↑ V↓

P↓ V↑

Boyle's

$V \propto \frac{1}{P}$

Charles

$V \propto T$

avogadro's

$V \propto n$

$$V \propto \frac{nT}{P}$$

$$V = \frac{R\,nT}{P}$$

$$PV = nRT$$

R — Universal Gas constant

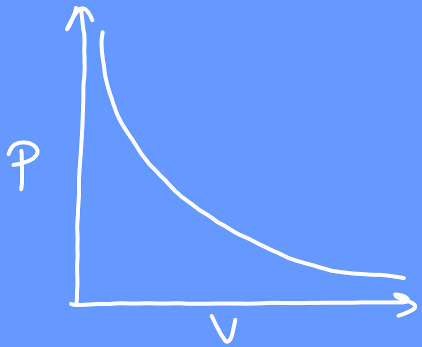
$8.314\ J\,K^{-1}\,mol^{-1}$

$0.0821\ l\ atm\ K^{-1}\,mol^{-1}$

$2\ cal\ K^{-1}\,mol^{-1}$

Graph Questions

1.



@ const Temp, n

PV =

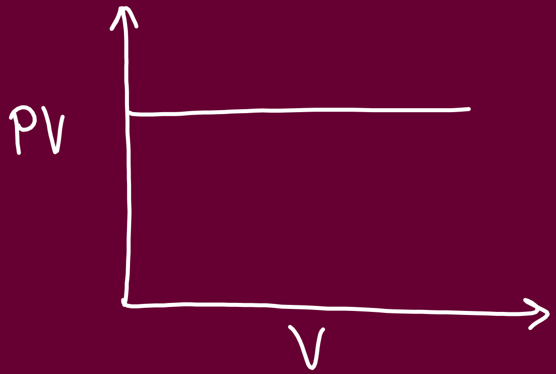
PV = k

P ↑ V ↓

P ↓ V ↑

Boyle's law

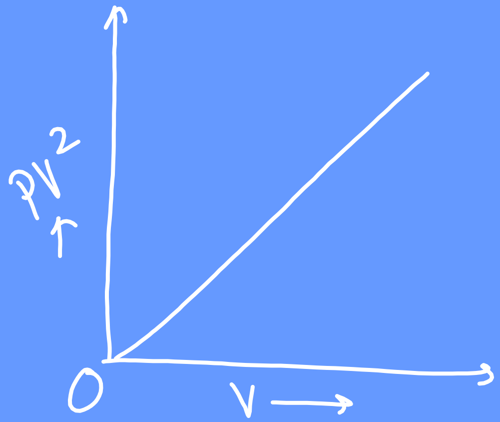
2.



Boyle's law

PV = k

(3)



Boyle's law

$PV =$ [scribbled out]

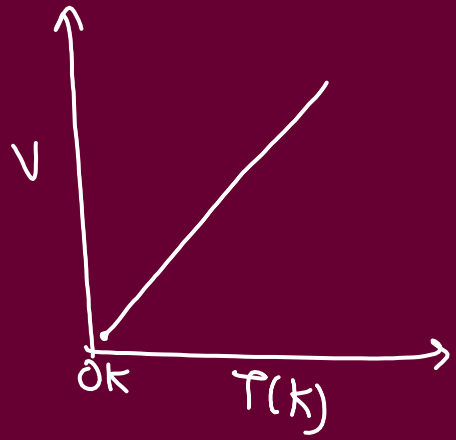
$PV = k$

× by V on both sides

$PV^2 = kV$

$y = mx$

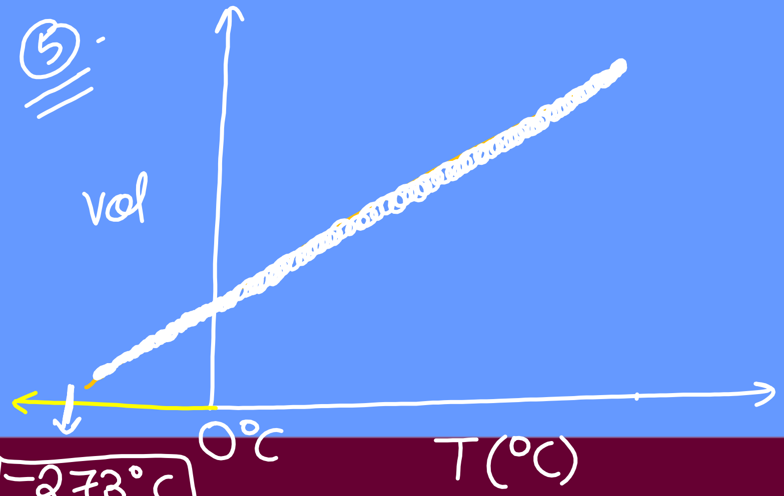
(4).



Charle's law → $V =$ [scribbled out] T

$V \propto T$

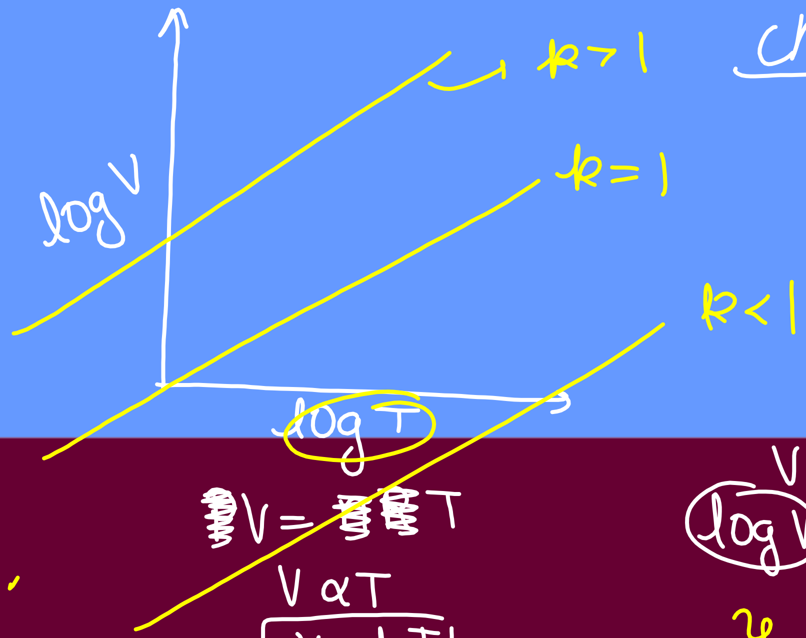
5.



$V_{gas} = 0$

−273°C ↓ 0K → absolute zero / absolute Temp → Gas cease to exist

⑥.



Charles's law

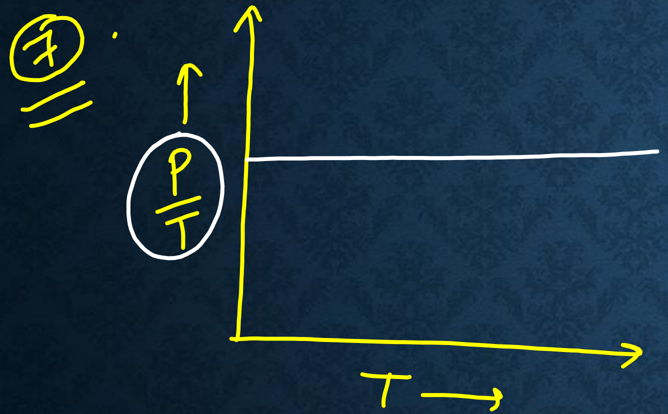
$V \propto T$

$V = kT$

$V = kT$

$\log V = \log k + \log T$

$y = c + mx$



Gay-Lussac's law

$P = kT$

$\frac{P}{T} = \frac{kT}{T}$

$\frac{P}{T} = k \times 1$

Equation of State

State A

State B

$PV = nRT$

$P_1V_1 = n_1RT_1$

$\frac{P_1V_1}{n_1T_1} = R$

Pressure P_1

no of moles n_1

Volume $= V_1$

Temp $= T_1$

P_2

n_2

V_2

T_2

$P_2V_2 = n_2RT_2$

$R = \frac{P_2V_2}{n_2T_2}$

$$R = R$$

$$\frac{P_1 V_1}{n_1 T_1} = \frac{P_2 V_2}{n_2 T_2}$$

Ques. Pressure of an ideal gas contained in a closed rigid vessel is increased by 20%, when it is heated by 60 K. Cal the final temp

$$\frac{360K}{T+60}$$

$P = T$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{P}{T} = \frac{P + 20/P}{T+60}$$

$$\frac{P}{T} = \frac{P + \frac{20}{100}P}{T+60}$$

$$\frac{P}{T} = \frac{1P + 0.2P}{T+60}$$

$$\frac{P}{T} = \frac{1.2P}{T+60}$$

$$T+60 = 1.2T$$

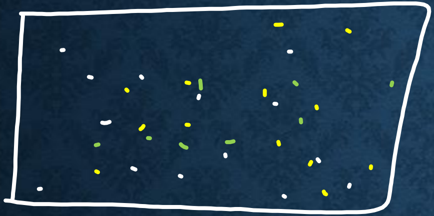
$$60 = 1.2T - T$$

$$60 = 0.2T$$

$$= T$$

$$300 = \frac{60 \times 10}{2}$$

Dalton's law of partial pressure



$$P_{Total} = P_A + P_B + P_C$$

Partial pressure of A P_A

Partial pressure of B P_B

Partial pressure of C : P_C

$$\text{Partial pressure}_{\text{Any gas}} = \text{Total pressure} \times \chi_{gas}$$

JEE PYQ

Equal mass of CH_4 & O_2 are mixed in a container at 25°C

The fraction of total pressure exerted by oxygen

O_2	CH_4
x g	x g

298 K

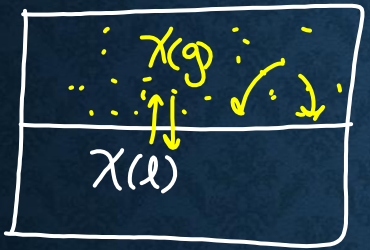
$$\frac{1}{3} = \frac{x}{3x}$$

$$PP_{O_2} = TP \times x_{O_2}$$

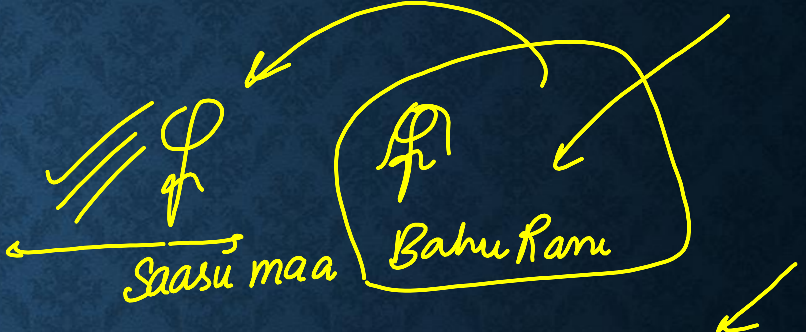
$$\frac{PP_{O_2}}{T.P} = x_{O_2} = \frac{n_{O_2}}{n_{O_2} + n_{CH_4}}$$

$$\left(\frac{\frac{x}{32}}{\frac{x+2x}{32}}\right) \qquad \left(\frac{\frac{x}{32}}{\frac{x}{32} + \frac{x}{16}}\right)$$

Vapor Pressure



$T = 25°C$



@ const Temp. the pressure exerted by the vapors on the surface of liquid [when liq & vap are in eq with each other]

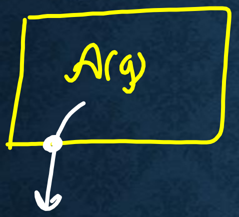
VP_{H_2O} = aqueous tension

moist gas

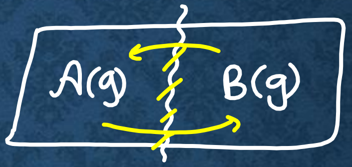
$$T.P = P_{gas} + VP_{H_2O}$$

VP_{H_2O} → aq tension

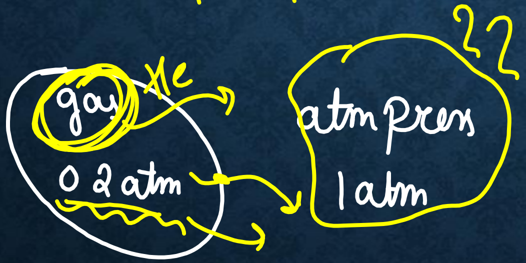
Effusion



Diffusion



Intermixing



Rate of effusion/Diffusion

* $\dfrac{\text{no of moles of the gas effusion}}{\text{time taken}}$

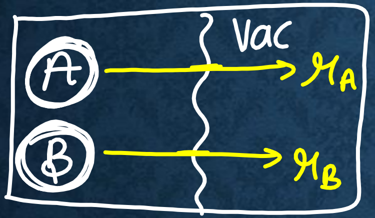
* $\dfrac{\text{vol effusion}}{\text{t t}}$

* $\dfrac{\text{dis travelled by the gas}}{\text{t t}}$

* $\dfrac{\text{dec in Press}}{\text{t.t.}}$

Graham's law

T, P → same



$$\frac{r_A}{r_B} = \sqrt{\frac{d_B}{d_A}} \quad \text{— (1) ★}$$

$$r \propto \frac{1}{\sqrt{d_{gas}}}$$

$$r \propto \frac{1}{\sqrt{MM_{gas}}} \rightarrow$$

★

$$\frac{r_A}{r_B} = \sqrt{\frac{M_B}{M_A}}$$

density of gas

Ideal $PV = nRT$

$PV = \frac{w}{M} RT$

$PM = \left(\frac{w}{V}\right) RT$ → d

$PM = d\,RT$

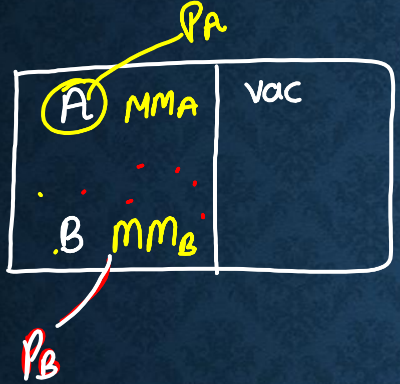
$$d = \frac{PM}{RT}$$

★

@P, R, T → const

$d \propto M$

jee adv



$$r_{gas} \propto \frac{P_{gas}}{\sqrt{MM_{gas}}}$$

$$\frac{r_A}{r_B} = \frac{P_A}{P_B}\sqrt{\frac{m_B}{m_A}}$$

$$\frac{r_A}{r_B} = \frac{n_A}{n_B}\sqrt{\frac{M_B}{M_A}}$$

→ inside the container

Ques The ratio of rate of diffusion of He & methane under identical P & T condition is

$$\frac{r_{He}}{r_{CH_4}} = \sqrt{\frac{MM_{CH_4}}{MM_{He}}} = \sqrt{\frac{16}{4}} = \sqrt{4}\ 1$$

2 : 1

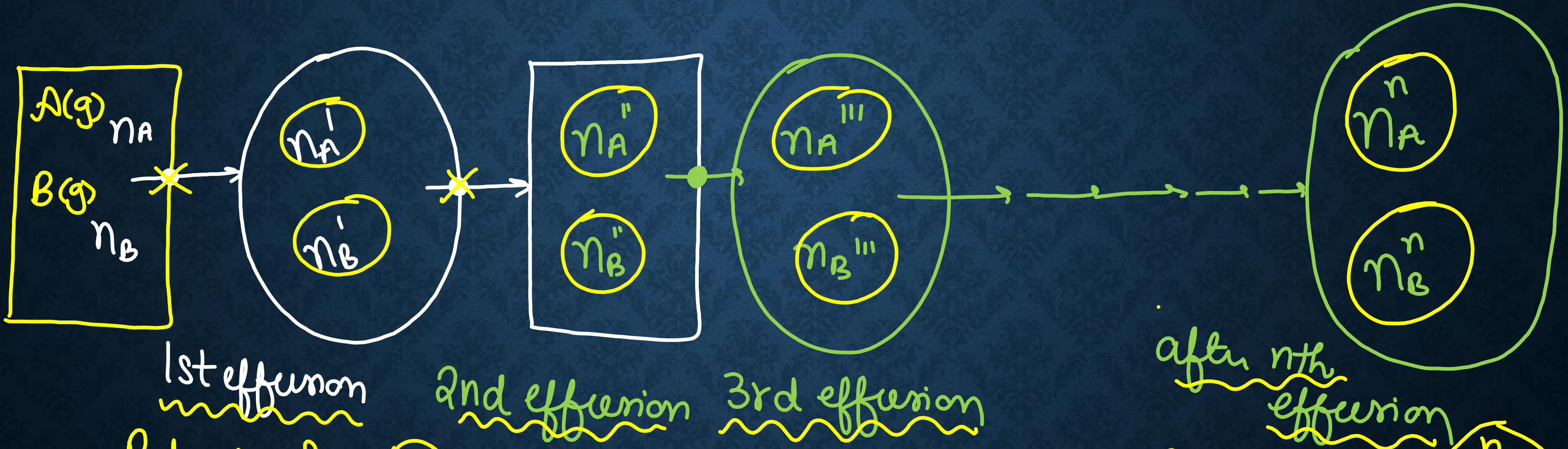
$$r_A = \frac{n_A}{t}$$

$$r_B = \frac{n_B}{t}$$

Same time interval

$$\frac{r_A}{r_B} = \left(\frac{n_A}{n_B}\right) \rightarrow \text{effused}$$

Successive effusion



Ratio of moles $\frac{n_A'}{n_B'}$

Ratio of moles = $\frac{n_A^n}{n_B^n}$

$$r_{gas} \propto \frac{n \text{ inside the container}}{\sqrt{mm_{gas}}}$$

$$\left(\frac{n_A}{n_B}\right)_{\text{effused}} = \left(\frac{n_A}{n_B}\right)_{\text{inside the contain}} \sqrt{\frac{m_B}{m_A}}$$

after 1st step

$$\frac{n_A'}{n_B'} = \frac{n_A}{n_B}\sqrt{\frac{m_B}{m_A}}$$

$$\frac{n_A''}{n_B''} = \frac{n_A'}{n_B'}\sqrt{\frac{m_B}{M_A}}$$

⋮

after nth step

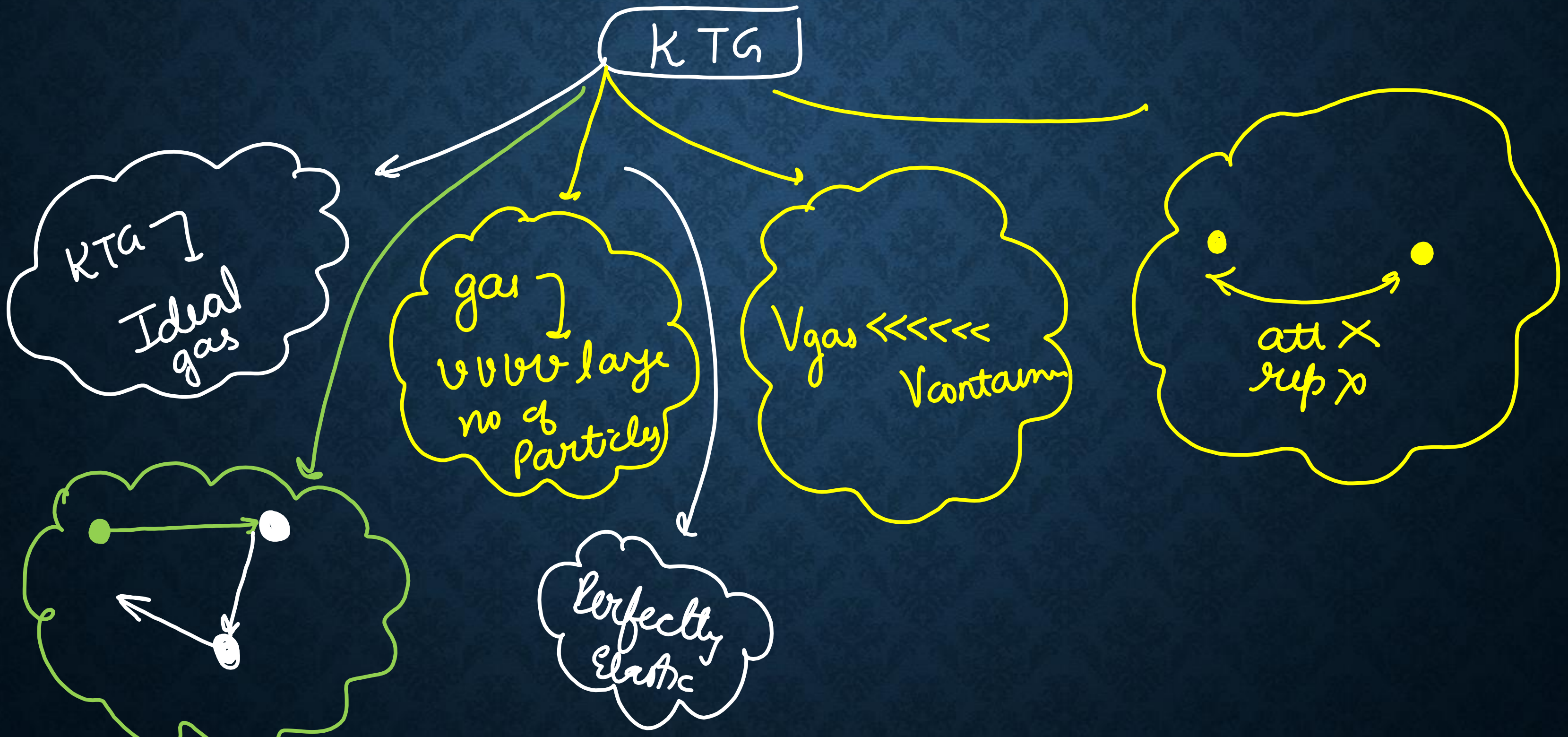
$$\frac{n_A^n}{n_B^n} = \frac{n_A}{n_B}\left(\sqrt{\frac{M_B}{M_A}}\right)^n$$

n → no of steps of effusion

$\frac{n_A^n}{n_B^n}$ → कितने moles effuse हुए after nth step

$\frac{n_A}{n_B}$ → initial moles in the container

Kinetic Theory of gases



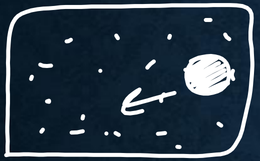
average KE per molecule

depends upon

Temp only

Hence Proved

KTG



1 particle

mass = m

contain volume = V

Speed of Particle = u

$$P = \frac{1}{3}\frac{m u^2}{V}$$

$$P = \frac{1}{3}\frac{m}{V}\left[u_1^2 + u_2^2 + u_3^2 + \cdots U_N^2\right]$$

$$P = \frac{1}{3}\frac{m}{V}\left[N\, U_{rms}^2\right]$$

Hence Proved

1 mole gas

$N = N_A$

$$P = \frac{1}{3}\frac{m}{V}\left[N_A u_{rms}^2\right]$$

m = mass of 1 particle

$m N_A \longrightarrow$ molar mass

$$P = \frac{1}{3}\frac{M}{V}\left[u_{rms}^2\right]$$

KE of a particle

$$KE = \frac{1}{2} m u^2$$

$$KE = \frac{1}{2} m \left[u_1^2 + u_2^2 + u_3^2 + \cdots + u_N^2 \right]$$

$$= \frac{1}{2} m \left[N \, u_{rms}^2 \right]$$

KE $\frac{\text{1 mole Particles}}{}$

$$= \frac{1}{2} m N_A \, u_{rms}^2 \rightarrow \frac{1}{2} M u_{rms}^2$$

$$KE = \frac{1}{2} m v^2$$

jeadv

KTG

KE & P → ?

$$P = \frac{1}{3}\left(\frac{M}{V}\right) U_{rms}^2 \quad \text{—— ①}$$

$$KE = \frac{1}{2} M U_{rms}^2 \quad \text{—— ②}$$

$$2KE = M U_{rms}^2$$

$$P = \frac{2}{3}\frac{KE}{V}$$

$$\frac{3}{2} PV = KE$$

$$KE = \frac{3}{2} nRT$$

$n = 1$

KTG

$$(KE)_{1\,mole} = \frac{3}{2}PV$$

$$= \frac{3}{2}RT$$

$$(KE)_{n\,mole} = \frac{3}{2}nRT$$

$$KE \propto n$$

$$\propto T$$

grado

average KE per molecule of the gas $\propto T$

$$(KE)_{avg} = \frac{\text{total KE}}{\text{total no of molecules}}$$

$$= \frac{\frac{3}{2} n RT}{n \cdot N_A}$$

$$= \frac{3}{2}\left(\frac{R}{N_A}\right)T$$

$$= \frac{3}{2} k_b T$$

$\frac{R}{N_A} = k_b =$ Boltzman's const

$$\frac{8.314 \, JK^{-1} mol^{-1}}{6.022 \times 10^{23} \, mol^{-1}}$$

$= JK^{-1}$

Different speeds of Particle

Sample → N particles

u_1 u_2 u_3 u_4 u_5 — — — u_n

$$U_{avg} = \frac{U_1 + U_2 + U_3 + U_4 + \cdots + U_N}{N}$$

Root mean square speed / u_{rms}

$$u_{rms} = \sqrt{\frac{u_1^2 + u_2^2 + u_3^2 + \cdots + u_N^2}{N}}$$

Square on Both sides

$$u_{rms}^2 = \frac{u_1^2 + u_2^2 + u_3^2 + \cdots + u_N^2}{N}$$

$$u_{rms}^2 \cdot N = u_1^2 + u_2^2 + \cdots + u_N^2$$

U most probable

↓

the speed corresponding to max no of particles

u_{mp}

R = 8.314 $JK^{-1}mol^{-1}$

T = K

(M) → molar mass

~~g/mol~~ Kg/mole

$$u_{mp} = \sqrt{\frac{2RT}{M}}$$

#SVshortcut

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

u_{av}

$$u_{rms} = \sqrt{\frac{3RT}{M}}$$

jee main 2013 -

u_{rms} u_{avg} u_{mp}

$\sqrt{\frac{3RT}{m}}$ $\sqrt{\frac{8RT}{\pi M}}$ $\sqrt{\frac{2RT}{m}}$

☆ $U_{rms} > U_{avg} > U_{mp}$

$\sqrt{3} : \sqrt{\frac{8}{\pi}} : \sqrt{2}$

$1.732 : \sqrt{\frac{8}{\pi}} : 1.414$

Real Gases

1. no gas — ideal
2. $PV = nRT$ (ideal)

   $PV \neq nRT$ (real/non-ideal)

1. V_{gas} not neg compared to the vol of container

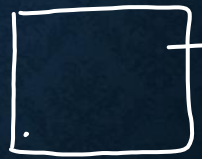
---

2. att ✓

   repulsive ✓

Volume correction

V_{gas} = vol available for the free movement of the gas



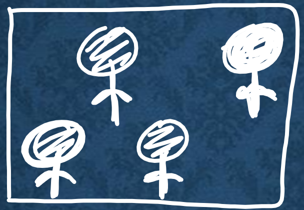
V = vol of container

$V_{gas} = V$

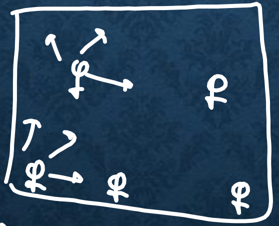
$$(V_{gas})_{Real} \neq V$$

$$(V_{gas})_{Real} = V - v'$$

v' → volume correct



$$V_{Real\ gas} = V - v'$$



$$V_{gas} = V$$

v' = volume correction = effective vol. of gas particles

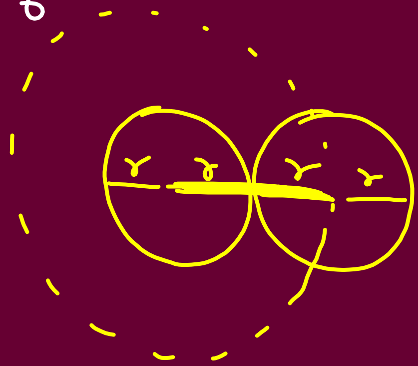
(b) = effective volume of 1 mole particles

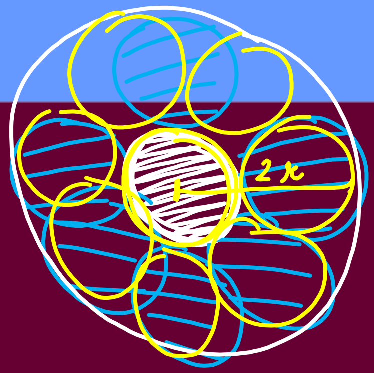
n moles particles → effective vol = nb

$$V_{gas} = V - nb$$

V_{gas} → vol. for free movement of gas

V → vol of container



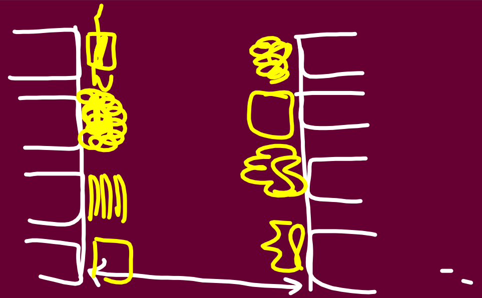


effective volume occupied by 2 particle $= \frac{4\pi}{3}(2r)^3$

$= 8 \times \frac{4}{3}\pi r^3$

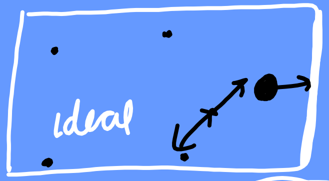
1 particle $= \frac{8}{2} \times \frac{4}{3}\pi r^3$

$= 4 \times \frac{4}{3}\pi r^3$

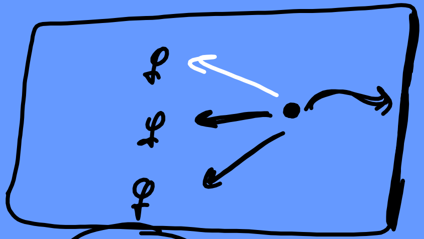


$$b = 4\,\frac{4}{3}\pi r^3\,N_0$$

Pressure correction P'



P_{ideal}



Real

$$P_{gas} = P_{ideal} - P'$$

Pren of real gas

$$P' = \frac{an^2}{V^2}$$

$$PV = nRT$$

$$P = \left(P - \frac{an^2}{V^2}\right)(\ldots)$$

Vandurwaal eq

for n moles of a gas

$$\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$$

for 1 mole

$$\left(P + \frac{a}{V_m^2}\right)(V_m - b) = RT$$

$n = 1 \longrightarrow V = \frac{V}{n} = V_m =$ molar vol

$a, b \longrightarrow$ vandurwaal gas constants

fixed value for every gas

$a \longrightarrow$ measure of intermolecular att forces

att ↑

a ↑

H_2 H_2

H—H ⋯ H—H

$\overset{\delta+}{H}$—$\overset{\delta-}{F}$. $\overset{\delta+}{H}$—$\overset{\delta-}{F}$

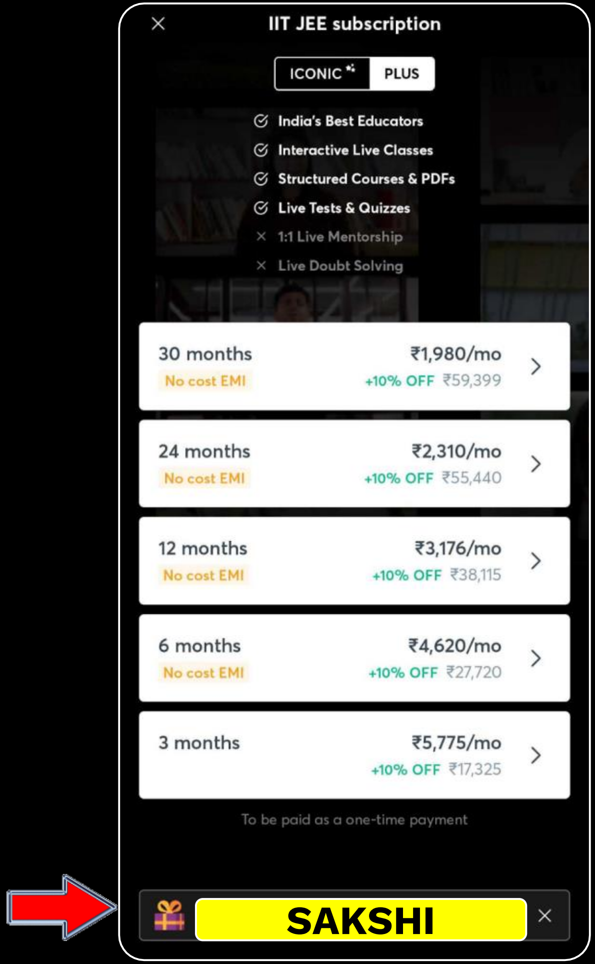
a ↑

size ↑ mass ↑ $\Rightarrow$ in forces of att (↑) a ↑

$a_{H_2} < a_{CO_2}$

(b) →


COMPETE
Battle and know where you stand
17K+ learners have competed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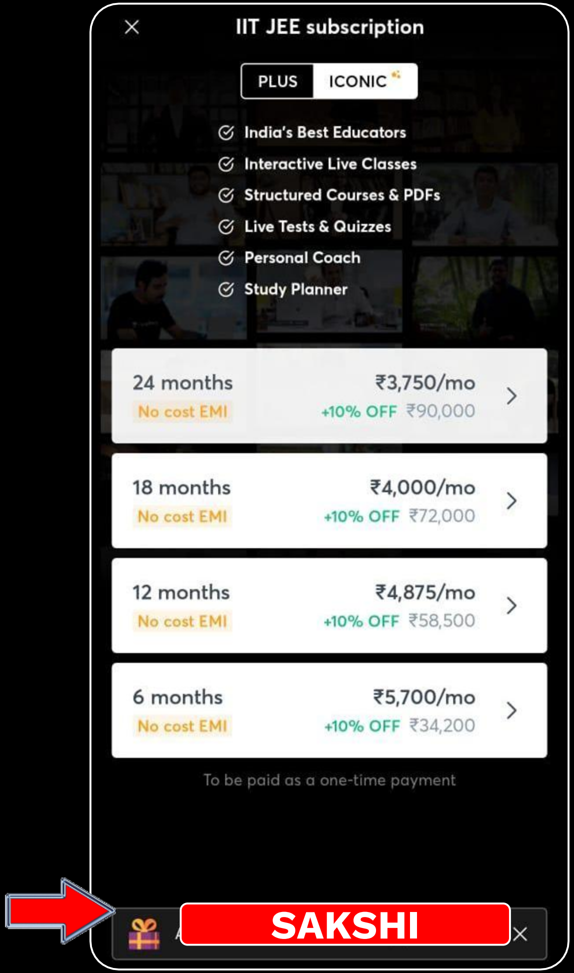
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