"بسم الله الرحمن الرحيم"

T → Kelvin.

- $P = \frac{F}{a}$
- $P = gdh$

Emperical gas laws ...

Boyle's law

$P_1V_1 = P_2V_2$

at fixed T.

عكسية.

charles's Law

$\frac{V_f}{T_f} = \frac{V_i}{T_i}$ at fixed P.

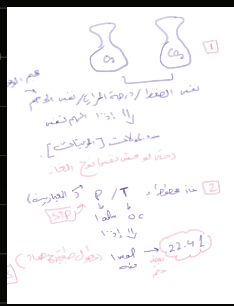
طردية.

combined

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

for given amount of gas

Avogadro's law



The Ideal gas law ...

⇓

$PV = nRT$

لما تدخل R لازم أستعمل وحدات معينة.

$\frac{P_1V_1}{T_1n_1} = \frac{P_2V_2}{T_2n_2}$ تعديل ①

$P = MRT$ تعديل ②

$PM_m = DRT$ تعديل ③

Gas Mixtures .....

- Dalton's law of partial pressure.

الضغط الكلي = مجموع الضغوط الجزئية.

كيف أجيب Partial Pressure??

- $P_A V = n_A RT$

- Mole Fraction....

$x = \frac{P_A}{P_T} / \frac{n_A}{n_T}$

عدد المولات × الكسر المولي × الضغط الكلي

. Collecting gas over water

$P_T = P_g + P_{H_2O}$

. Kinetic ~Energy

$\frac{1}{2} m v_s^2$

. Molecular speed

$u_s = \sqrt{\frac{3RT}{M_m}}$

$T \uparrow u \uparrow$

$\uparrow M_m \; u \downarrow$

[Any two gases at the same temperature will have the same average kinetic energy
Because the average kinetic energy of a molecule is proportional To only T]

. Gorham's law of diffusion....

Rate of diffusion $= \frac{R}{\sqrt{M_m}} \Big/ \frac{V \uparrow}{T \downarrow}$ → R

Ratio → for the same container at fixed P and T.

. Van der waals equations..

ideal gas → V → becomes → $V - nb$

→ P → becomes → $P + \frac{n^2 a}{V^2}$

van der waals equations

$PV = nRT$

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

$P_{actual} = P_{ideal} - \frac{n^2 a}{V^2}$

$V_{actual} = V_{ideal} + nb$