HOW TO SOLVE ? STOICHIOMETRY PROBLEM

$3A + 4B \rightarrow A_3B_4$

1 Converting reactants into moles

- Grams(w) → $n = \frac{w}{m}$
- Liters(V) → $n = \frac{PV}{RT}$
- No. of Particles → $n = \frac{\text{No. of Particles}}{6.022 \times 10^{23}}$

→ Moles(n) → We Get

(A)	(B)
x moles	y moles

2 Finding Limiting Reagent (L.R)

Divide by Coefficient of any Reactant, in above reaction its 'A' i.e. 3

$A + \frac{4}{3}B \rightarrow \frac{1}{3}A_3B_4$

1 mole A reacts with $\frac{4}{3}$ moles B

x mole A reacts with $\frac{4}{3}x$ moles B

Is $\frac{4}{3}x > y$?

- Yes → B is LR
- No → A is LR

3 Find Moles of Product using L.R (assume L.R = B)

$4B \rightarrow A_3B_4$

4 moles of 'B' gives 1 mole A_3B_4 → so y moles of 'B' gives $\frac{1}{4}$ (y) moles A_3B_4

$n = \frac{1}{4}y$

4 Converting Product Moles into required quantity

Product A_3B_4 (n)

- $w = n \times m$ → Grams(w) → $w / A.M.U$ → A.M.U 1.66×10^{-24} gm
- $V = \frac{nRT}{P}$ → Liters(V)
- No. of particle $= n \times 6.022 \times 10^{23}$ → Particles → Total no. of Particles → Gram Atom

Concentration Terms

Part-I

Molarity (M)

Molarity is no. of moles of a solute per liter of solution

$$M = \frac{\text{moles of solute}}{\text{volume of solution(in liter)}}$$

Molality (m)

Molality is the no. of moles of solute per kilogram of solvent.

$$m = \frac{\text{moles of solute}}{\text{weight of solvent (in kg.)}}$$

Normality (N)

Normality is the gram equivalent weight per liter of solution.

$$N = \frac{\text{gram equivalents of solute}}{\text{volume of solution(in liter)}}$$

Formality (f)

Formality is the no. of gram formula masses of the ionic solute dissolved per liter of solution.

$$f = \frac{\text{weight in gram}}{\text{formula weight} \times \text{volume of solution(liter)}}$$

Mole Fraction

Mole Fraction is equal to the moles of one component divided by total moles in the solution or mixture.

$$X_A = \frac{n_A}{n_A + n_B}$$

Parts per million (ppm)

Parts per million is value that represent the part of whole no. in units of 1/1000000

$$ppm = \frac{\text{mass of solute}}{\text{mass of solvent}} \times 10^6$$

CONCENTRATION OF SOLUTION

Part-II

(1) % by weight

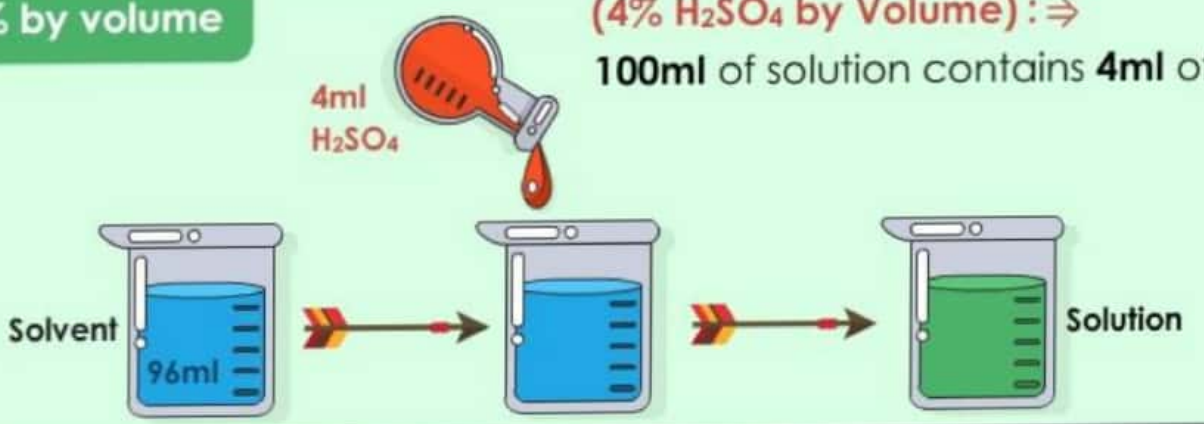
(4.9% H_2SO_4 by weight) : ⇒

100gm of solution contains **4.9gm** of H_2SO_4

(2) % by volume

(4% H_2SO_4 by Volume) : ⇒

100ml of solution contains **4ml** of H_2SO_4



(3) % weight by volume

(4% H_2SO_4 w/v) : ⇒

4ml H_2SO_4 present in **100ml** of solution.

(4) % volume by weight

(4% H_2SO_4 v/w) : ⇒

4ml H_2SO_4 present in**100gm** solution.