01/05/17 Physical chemistry.

* Mole concept :

* Atomic mass/molecular mass :
mass of 1 atom/molecules Called atomic mass/molecular mass. Its unit will be a.m.u (atomic mass unit)

for Ex: O ⇒ 16 a.m.u/atom.
H_2O ⇒ 18 a.m.u/molecules

1 mole = NA = 6.023×10^{23}

1 a.m.u = 1.67×10^{-27} gram

1 a.m.u = $\frac{1}{Na}$ gram.

* Molar mass :
Mass of one mole Entities Called Molar mass.

- Mass of 1 mole atom Called gram atomic mass (G.A.M)
- Mass of 1 mole molecules called gram molecular mass (G.M.M)

O = 16 a.m.u/atom ⇒ 16 gram/mole.
↑ atomic mass ↑ Molar Mass

Que: Calculate molar mass of electron in kg/mol.

Ans: $e^- = 9.1 \times 10^{-31}$ kg

$= 9.1 \times 10^{-31} \times Na$ kg/mol.

Que: Calculate mass of 1000 CO_2 in kg

Ans: $CO_2 = 44$

$= 44$ a.m.u / molecules

$= 44 \times 1000$ a.m.u / molecules

$44 \times 1000 \times \frac{1}{Na}$ gram

* Mole $= \frac{\text{Number}}{Na}$, Mole $= \frac{\text{Mass}}{\text{Molar Mass}}$

* **for Ideal gas:**

$PV = nRT$

$n = \frac{PV}{RT}$

(n = mole of gasious particle
P = atmosphere
T = kelvin
V = liter
R = .0821 atm litre/mol k.)

$n = \frac{V}{RT/P} = \frac{V(L)}{22.4}$

$P = 1$ atm, $T = 273$

1 atm = 1.01 bar.

* at S.T.P condition
P = 1 bar T = 273

$$n = \frac{V}{RT/P} = \frac{V(L)}{22.7}$$

Que: Calculate mol of atom in 22.4 ml $CO_2(g)$ at 1 atm & 273 kelvin.

Sol^n: $n = \frac{V(L)}{22.4} = \frac{\frac{22.4}{1000}}{22.4} = \frac{1}{1000}$

1 mole of $CO_2 = \frac{1}{1000}$

3 mole of $CO_2 = \frac{1}{1000} \times 3 = \frac{3}{1000}$ Ans.

Que: Calculate mole of electron 16 gram O^{-2} ion?

Ans: mole of $O^{-2} = \frac{16}{16} = 1$ mol.

Mole of $e^- = 1$ mole.

Que: Calculate mole of Oxygen atom in 5 mol $Na_2CO_3 \cdot 10H_2O$

Ans: 1 mole of Oxygen = 13
5 mole of oxygen = 13 × 5 = 65 mol.

* Stoichiometry of chemical Reaction :

$$N_2 + 3H_2 \longrightarrow 2NH_3$$

	1m	3m	2mol.	
Only for gasious component.	1 atm	3 atm	2 atm	$V=C, T=C, P \propto n$
	1 litre	3 litre	2 litre	$P=C, T=C, P \propto V$

Que: $A(g) + 2B(g) \longrightarrow 3C(g)$

If 5 mol of $B(g)$ is taken with excess amount of $A(g)$ then calculate volume of $C(g)$ Product at S.T.V.

Ans: $A(g) + 2B(g) \longrightarrow 3C(g)$

excess 5 mol. $\frac{15}{2}$

Produce mole of $C(g) = \frac{15}{2}$

$$n = \frac{V}{22.7}$$

Que: $2X + 3y \longrightarrow 2z$

7 mole →

mole of $z = \frac{2}{3} \times 7 = \frac{14}{3}$ Ans

Que:- $2A + 5B \xrightarrow{40\%} 7C$

10 mole

mole of $7C = \frac{40\%}{} \Rightarrow \frac{7}{2} \times 10 = 35$ mole

mole of $C = 35 \times \frac{2}{5} \times \frac{40}{100} = 14$ mole.

→ Limiting Reagent.

* $A(g) + 2(B)(g) \longrightarrow 3C(g)$

* Limiting Reagent :-

Reactant is the Consume Ist in the Reaction called Limiting Reagent. Amount of Product is determine according to limiting Reagent in the Reaction.

- Reactant which have minimum value of mole & stoichometric efficient will work has limiting reagent.

→ L.R

Que:- $2X + Y \xrightarrow{50\%} 3Z$

5mol 4mol

mole of $Z = \frac{3}{2} \times 5 \times \frac{50}{100} = \frac{15}{2} \times \frac{5}{10} = \frac{15}{4}$

Li- M.N = 7

Que: $N_2 + 3H_2 \xrightarrow{L.R} 2NH_3$

8 atm 5 atm

Calculate Pressure of NH_3 & also Calculate.

Ans: mole of $NH_3 \rightarrow \frac{2}{3} \times 5 = \frac{10}{3}$ mol.

P_{NH_3} $3 - \frac{4}{3} = 5 - \frac{2}{3} \times 5 = \frac{5}{3}$

$3 - \frac{5}{3} = \frac{4}{3}$

Remaining Pressure of $NH_3 = \frac{4}{3}$

Total Pressure = $\frac{10}{3} + \frac{4}{3} = \frac{14}{3}$ Ans

Que: Li_2O react of Li with O_2. If Initialy 14 gram Li is takened 32 gram O_2 than Calculate Produce amount of Li_2O in gram.

Ans: $Li^\circ + O_2 = Li^\circ O_2$

$2Li^\circ + \frac{1}{2}O_2 = 2Li^\circ O$

14 gram 32 gram (This is not react 14 gram)

L.R

$2Li^\circ + \frac{1}{2}O_2 \rightarrow 2Li^\circ O_2$

14 gram 32 gram

$\frac{14}{7} = 2$ $\frac{32}{32} = 1$

L.R

$2Li + \frac{1}{2}O_2 \rightarrow Li_2O$

2 mol 1 mol.

mole of $Li_2O \Rightarrow \frac{1}{2} \times 2 = 1$ mol Ans

Que: H_2O_2 Hydrogen Peroxide is Produce by Reaction of H_2 with O_2 in a Container 5gm H_2 is taken with 32 gm O_2. then calculate Mass of H_2O_2 is 80%.

Ans: $H_2 + O_2 \xrightarrow{80\%} H_2O_2$

5gm 32g

$\frac{5}{2}$ mol $\frac{32}{32}$ mol

2.5 mol 1 mol

mole of $H_2O_2 \Rightarrow \frac{1}{1} \times 1 = 1$

$= 1 \times \frac{80}{100} = 0.8$ mol.

Que: $A + 2B \xrightarrow{50\%} 2C + 3D$

3 mol. 5 mol.

$2D + 3C \xrightarrow{30\%} E + 2G$

Calculate Produce mole of G.

Ans: $A + 2B \xrightarrow{50\%} 2C + 3D$ (L.R)

3 mol 5 mol 5 mol. $\frac{15}{2}$ mol.

mole of C = $\frac{2}{2} \times 5 = 5 = 5 \times \frac{50}{100} = \frac{5}{2}$

mol of D = $\frac{3}{2} \times 5 = \frac{15}{2} = \frac{15}{2} \times \frac{50}{100} = \frac{15}{4}$

$2D + 3C \xrightarrow{30\%} f + 2G$ (L.R)

$\frac{15}{4}$ mol. $\frac{5}{2}$ mol.

mole of G = $\frac{2}{2} \times \frac{15}{4} = \frac{15}{4} = \frac{75}{4} \times \frac{30}{100} = \frac{9}{8}$ Ans.

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Que: $X + 2Y \xrightarrow{50\%} 3P + 4Q$

$4Q \xleftarrow{40\%} 2P + Z$

$Z \xrightarrow{30\%} P$

5 mole of Y is taken with excess amount of X then Calculate total produce mol of P taking the given Sequential Rxn. ?

Ans: $X + 2Y \xrightarrow{50\%} 3P + 4Q$

excess 5 mol

$\frac{3}{2} \times 5 = \frac{15}{2}$ $\frac{4}{2} \times 5 = \frac{20}{2}$

$\frac{15}{2} \times \frac{50}{100} = \frac{15}{4}$ $10 \times \frac{50}{100} =$

$= 5$ mol.

$\frac{15}{4}$ mol

4Q $\xrightarrow{40\%}$ 2P + Z

5mol

$\frac{2}{4} \times 5 =$ $\frac{1}{4} \times 5 = \frac{5}{4} \times \frac{40}{100}$

$= \frac{10}{4} \times \frac{1}{100}$ $= \frac{1}{2}$ mole.

1 mole

Z $\xrightarrow{30\%}$ P

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

$\frac{1}{2} \times \frac{30}{100} = \frac{3}{20}$ mole.

$n_P = \frac{3}{20}$ mole

(ii) In above question calculate require mole of y Can Presence of exess X. to Produce 1 mole of P

Ans: x + y = P

exess x 1mol.

Let mole of y = x

mole of y = 1 Ans $\frac{1}{1} \times x = 1$

$x = 1$

Ans

Que :- Percentage purity of a $CaCO_3(s)$ is 80%. This sample is heated to produce CO_2 gas If by heating 2.27 ml of $CO_2(g)$ is obtained at S.T.P then calculate required mass of sample. is If Percentage efficiency of reaction is 60%.

$$CaCO_3 \xrightarrow{60\%} CaO_{(g)} + CO_2(g)$$
$$2.27\ ml.$$

Ans :

Let required sample of $CaCO_3$ is x gm
mass of $CaCO_3$ in this sample

(80) → $CaCO_3 \xrightarrow{60\%} CaO_{(g)} + CO_2(g)$

$\frac{\frac{80}{100} \times x}{100}$ $\qquad$ $\frac{\frac{80}{100} \times x}{100} \times \frac{60}{100}$

$$n_{CO_2} = \frac{\frac{80}{100} \times x}{100} \times \frac{60}{100} = \frac{\left(\frac{2.27}{1000}\right)}{22.7}$$

Que: Percentage purity of H_2O sample is 50%. from this sample H_2O is dissociated to produce Hydrogen and Oxygen. If % eld of reaction is 40% and total produce volume of Hydrogen and oxygen 4.48 ml at 1 atm & 273 kelvin. How much grams of initial centre will we taken

Ans

$$H_2O \xrightarrow{40\%} H_2 + \frac{1}{2}O_2$$

$$\frac{\frac{50}{100} \times n}{18} \qquad \frac{n}{36} \qquad \frac{n}{72}$$

$$\frac{n}{36} \times \frac{40}{100} \qquad \frac{n}{72} \times \frac{40}{100}$$

$$n = \frac{V}{22.4}$$

$$= \frac{4.48/1000}{22.4}$$

$$= 2 \times 10^{-4} \text{ ml}$$

$$\frac{n}{36} \times \frac{40}{100} + \frac{n}{72} \times \frac{40}{100} = 2 \times 10^{-4}$$

* Principle of atom Conservation :

During a chemical reaction mole of atoms of a element remain conserved they only move from 1 molecules to another molecules

Note : but during a reaⁿ mole of molecules do not remain conserved.

Que: Calculate Produce amole KCl & $KClO_4$ if 8 mol $KClO_3$ in Completely converter in KCl & $KClO_4$?

$$\underset{6}{KCl} + \underset{4}{KClO_4} \longrightarrow 8KClO_3$$

Imp:

Que: In Carius method of Stemisation of Halogen 250 mg of an organic compound produce 141 mg of AgBr then what will be percentage of Bromine in that organic compound.

Ans:

Ag Br

108 + 80

188 molar mass

Concept: All the atoms of Bromine in Organic Compound will come in AgBr during the reaction.

$$\text{mole of AgBr} = \frac{141}{188} \times 10^{-3}$$

$$\text{mole of Br-atom in AgBr} = \frac{141}{188} \times 10^{-3}$$

$$\text{Mass of Br-atom} = \frac{141}{188} \times 10^{-3} \times 80$$

$$\% \text{ of Br in organic comp.} = \frac{\frac{141}{188} \times 10^{-3} \times 80}{250 \times 10^{-3}} \times 100$$

* Questions Related to mixture :

* Some Importants Reactions :

1) By Carbonates of IA & 2nd A group on heating Convert in their respective Cabonates

$$\underset{IA}{NaHCO_3} \xrightarrow{\Delta} Na_2CO_3(s) + H_2O + CO_2(g)$$

$$\underset{IIA}{Ca(HCO_3)_2} \xrightarrow{\Delta} CaCO_3(s) + H_2O(g) + CO_2(g)$$

2) On Strong heating Carbonets of IIA group will convert in their respective oxides

$$CaCO_3 \xrightarrow{\Delta} CaO(s) + CO_2(g)$$

$$MgCO_3(s) \xrightarrow{\Delta} MgO(s) + CO_2(g)$$

(3) But on Strong heating Carbonet of IA group do not convert in their respective oxides

$$Na_2CO_3 \xrightarrow{\Delta} Na_2O + CO_2 \times$$

exception: $Li_2CO_3 \xrightarrow{\Delta} Li_2O + CO_2$ ✓

(because Li represent diagonal relationship with Mg in Periodic table)

(Weight lost during a Chemical due to gasious Product).

Que: 92 g mixture of $CaCO_3$ and $MgCO_3$ on strong heating provide 24.63 liter at one atm and 300 kelvin temperature. Then calculate mass % of $CaCO_3$ in initial mixture.

Ans:

$$CaCO_3 \xrightarrow{\Delta} CaO_{(s)} + CO_{2(g)}$$
$$\frac{x}{100} \qquad\qquad \frac{x}{100}$$

$$MgCO_3 \xrightarrow{\Delta} MgO_{(s)} + CO_{2(g)}$$
$$\frac{(92-x)}{84} \qquad\qquad \frac{92-x}{84}$$

$x = 50\,g$

~~50 gram~~ $\times \frac{92}{100} = \frac{92}{2}$

$$\frac{x}{100} + \frac{92-x}{84}$$

$x = 50$

$PV = nRT$

$$n = \frac{PV}{RT} = \frac{1 \times 24.63}{0.821 \times 300} = 1 \quad (1)$$

$$\% CaCO_3 = \frac{x}{92} \times 100.$$

* **Average molar mass:**

mole → n_1 — A — M_1 (molar mass)
n_2 — B — M_2
n_3 — C — M_3

$$M_{avg.} = \frac{n_1M_1 + n_2M_2 + n_3M_3}{n_1 + n_2 + n_3}$$

Special case: If mole % of component are provided

A = x% by mol
B = y% by mol
C → 100 − (x + y) by mol.

$$M_{avg.} = \frac{xM_1 + yM_2 + (100-(x+y))M_3}{100}$$

* If mass % of Component are provided
  A ⟶ x % by mass
  B → y % by Mass
  C → 100 − (x + y) % by mass

Que: Average Molar mass of a mixture of N_2 and O_2 is 30 g Per mole then Calculate mole % of N_2 in given mixture.

Ans:

N_2 & O_2
↓ (100 − x)
x %

Let N_2 is x % by mol. then O_2 will be (100 − x) % By mole.

$$30 \text{ g/mol } M_{avg} = \frac{x(2x) + (100-x)(32)}{100}$$

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* Percentage composition of a compound:

CH_4

% of $C = \frac{12}{16} \times 100$

% of $H = \frac{4}{16} \times 100$

Que: An organic compound contain 1% of Sulphur then what can be molecular weight of ~~dissove~~ this organic compound.

Ans: $\% S = \frac{32(n)}{M.Wt} \times 100 = 1$

$M.Wt = 32(n) \times 100$

* Empherical formula:

Molecular formula	Empherical formula
$C_6H_{12}O_6$	CH_2O
C_2H_6	CH_3
CH_3COOH	
$C_2H_4O_2$	CH_2O

$n = \frac{M.Wt}{\text{Empirical formula weight.}}$

* In a given sample of a compound ratio of mole of atoms will be equal to ratio of no. of atoms with in a molecules

In one Mole
$C_6H_{12}O_6$

6 : 12 : 6

1 : 2 : 1

n-mole
$C_6H_{12}O_6$
mole of C-atom = 6n
mole of H-atom = 12n
mole of O-atom = 6n
6n : 12n : 6n
1 : 2 : 6

Que: Analysis of a hydrocarbon sample produce that sample of hydrocarbon contain 84 gram of Carbon and if all the hydrogen is eliminated in form of Hydrogen gas its volume is 3.5 × 22.4 L at 1 atmosphere and 273 K. then what will be empirical formula hydrocarbon.

Ans: Hydrocarbon

mole of Carbon atom = 84 gm of Carbon
mole of C-atom = $\frac{84}{12}$ = 7
mole of H_2 = 3.5
mole of H = 7

Ques: In a compound Carbon is 3.6 gm Hydrogen is .7 g and N is 1.4 gm remaning amount is Oxygen if total weight of comp. e sample is 7.3 gram. then calculate Molecular formula of compound. let molecular weight of comp. is 73.

Ans: Let molecular weight of compound is 73

C_3H_7NO

Ans:

$$\text{Carbon} = \frac{3.6}{12} = 0.3$$

$$H = \frac{0.7}{1} = 0.7$$

$$N = \frac{1.4}{14} = 0.1$$

$$O = \frac{1.6}{16} = 0.1$$

Eq C_3H_7NO

7.3 − ( )

* Density:

1) Absolute Density → $D = \frac{\text{mass}}{\text{Volume}}$

2) Relative Density → Relative density

Absolute density.

Absolute density = $\frac{\text{mass}}{\text{Volume}}$

Whenever density of a substance is calculated with respect to other substance It is called Relative density

Ex: Specific gravity

This Relative density is define with respect to water.

Spacific density = $\frac{d \text{ substance}}{d_{H_2O}}$ = d substance

This will be unit less quantity.

(9) Vapour density : At same pressure and temp. if density of a gas is calculated with respect to other gas (Generally Hydrogen) then it is called vapour density

Vapour density = $\frac{\text{density of gas}}{\text{d relative gas.}}$

$= \frac{d_{gas}}{d_{H_2O}}$

$P_V = nRT$

$P_V = \frac{mass}{M} RT$

$PM = \frac{mass}{V} RT$

$PM = Density\ RT$

$Density = PM/RT$

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

→ $V.D = \frac{PM_{gas}/RT}{P(2)/RT}$

$V.D = \frac{M_{gas}}{2}$

$M_{gas} = 2 \times V.D$

* Concentration term :

1. Molarity (M) = $\frac{\text{Mole of Solute}}{\text{Volume of solution in (litre)}}$

2. Molality (m) = $\frac{\text{Mole of Solute}}{\text{mass of solvent}}$

3. Normality = $\frac{\text{gm Equivalent of Solute}}{\text{Volume of solution in litre}}$

4. $\% \frac{w}{w}$ = $\frac{\text{weight of Solute}}{\text{weight of Solution}} \times 100$

5. $\% \frac{V}{V}$ = $\frac{\text{Volume of Solute}}{\text{Volume of solution.}} \times 100$

6. $\% \frac{w}{V}$ = $\frac{w \text{ solute (gm)}}{V \text{ solution (ml)}} \times 100$

7. Mole fraction of Solute = $\frac{n \text{ solute}}{n \text{ solution.}}$

8. P.P.M = $\frac{\text{mass of solute}}{\text{mass of solution}} \times 10^{-6}$

9. P.P.B = $\frac{\text{Mass of solute}}{\text{mass of solution}} \times 10^{9}$.

(Solute ~~conc~~ = Dilute for use) (8, 9)

P.P.M and P.P.b these Concentration term are used for very dilute solution for very dilute solution.

∴ mass of solution will be approximately equal to mass of solvent.

Example :- 20 % w/v aqua solution of NaOH then Calculated its molarity ?

Ans :- $\frac{\text{weight of solute}}{\text{volume of solution}} \times 100 = 20$

$M = \frac{\text{mole of solute}}{\text{Volume of solution in L.}}$

Let $V_{soln} = 100\ ml$

$W_{solute} = 20$ gram

$M = \frac{20/40}{100/1000}$

$= \frac{1/2}{1/10} = \frac{1}{2} \times \frac{10}{1} = 5$

(ii) Calculate mole fraction of NaOH in above question if iden density solution is 1.2 gm/ml.

Ans :- $\frac{W_{solute}}{V_{solution}} \times 100 = 20$

Let $V_{sol} = 100\ ml$

$\frac{W_{solute}}{100ml} \times 100 = 20$

weight of solute $= 20$

$\rightarrow$ mass of solution $= 120\ gm$

$n_{solute} = \frac{n_{solute}}{n_{solute} + n_{solvent}}$

$= \frac{\frac{20}{40}}{\frac{20}{40} + \left(\frac{100}{18}\right)}$

$14+2+12+16+14+2$

NH_2CONH_2 (60)

Que: mole fraction of urea in it of solution is 0.1 then calculate % w/w of urea solution.

Ans:

$$X_{urea} = \frac{n_{urea}}{n_{urea} + n_{H_2O}} = 0.1$$

$$n_{urea} + n_{H_2O} = 1$$

$$n_{urea} = 0.1$$

$$H_2O = 0.9$$

$$\% \frac{w}{w} = \frac{w_{solute}}{w_{solution}} \times 100$$

$$\frac{0.1 \times 60}{(0.1 \times 60 + 0.9 \times 18)}$$

☆

Que: A Compound H_2X with molar mass 18 gm per mol is dissolved in a solvent having density 0.4 g/ml assuming no change in volume upon dissolution calculate molality of 3.2 molar solution

Ans:

~~Molality~~ $= \frac{H_2X}{H_2X + n_{H_2O}} = 18$ gm

Let $H_2X = 1$

$$H_2X + n_{H_2O} = \frac{1}{18}$$

$$H_2X = \frac{1}{18} - \frac{9}{1}$$

$$H_2X = \frac{1 - 72}{18} = \frac{71}{18}$$

Molality =

Ans: $\frac{\text{mole of solute}}{\text{Vol. of solution in litre}} = 3.2$

Vol. of sol^n = 1 litre

mole of solute = 3.2 ml

$V_{solvent}$ = 1 litre = 1000 ml

molality $= \frac{\text{mole of solute}}{\text{mass of solvent in kg}}$

$d = \frac{mass}{V}$

$\frac{mass}{V} = 0.4$

mass = 400

$= \frac{3.2}{\frac{400}{1000}} = 8$

H.W

Que:- 1 M = 0.1 of an aqua glucose solution then calculate $\frac{w}{v}$% ? also calculate molality of this solution = 1.2 gm/ml = (6.3)

(2) 100 P.P.m sol^n of Calcium Carbonate then calculate molality of this solution.

Ans:- $\frac{\text{mass of solute}}{\text{mass of solution}} \times 1000000 = 100$

Let mass of sol^n = 1000000

$\frac{\text{mass of solute} \times 100}{100} = 100$

mass of solute = 100

$M_{solvent} = M_{sol^n} - M_{solute}$
$= 1000000 - 100$
$= 9999 \times 10^2$

Mole of solute = $\frac{\text{Mass}}{\text{Molecular Mass}}$

$= \frac{100}{40} = \frac{5}{2} = 2.5$

Mole of solute = 2.5

Molality = $\frac{\text{mole of solute}}{\text{mass of solvent}}$

$= \frac{2.5}{10^6}$

=

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Ans: 1 $M = 0.1 = \frac{n}{V(l)}$

Let, $V(l) = 1$ litre

$n = 0.1$ mol.

$\frac{W_{solute}}{V_{solution}} \times 100$

$\frac{0.1 \times 180}{1000}$

$m = \frac{0.1}{1200 - (0.1 \times 180)}$

Ans: 2

Ans: $\frac{\text{Mass of solute}}{\text{mass of sol}^n} \times 10^6 = 100$

let, mass of $sol^n = 10^6$ gm.

mass of solute = 100 g.

$m = \frac{\text{mol.}}{\text{mass of Solvent in kg}}$

$\frac{100}{40}$

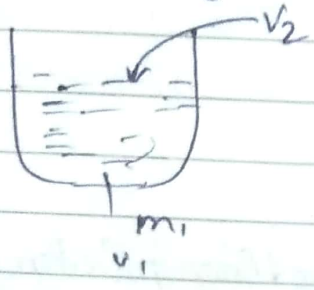
$\frac{10^6}{1000}$

$= 100$

not change solute.
~~add solvent~~.

* Case of dilution :
during the dilution Amound the of solute will not change.

*



$$M = \frac{M_1 V_1}{V_1 + V_2}$$

$$\%\frac{w}{v} = \frac{\left(\frac{\%\, x \times V_1}{100}\right)}{V_1 + V_2} \times 100$$

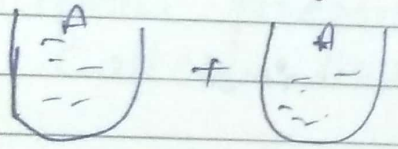
$$\%\, x = \%\frac{w}{V} = \frac{w_{solute}}{V_{soln}} \times 100$$

$$\%\, x = \frac{w_{solute}}{V_1} \times 100$$

$$\%\, \frac{x \times V_1}{100} = w_{solute}$$

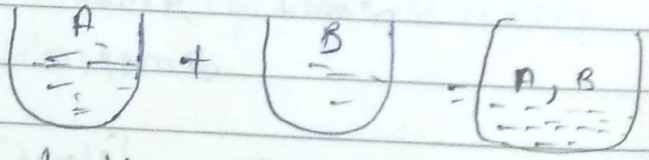
DONE

* Case of mixing of unreacted Soln :



Soln of A Soln of A

$$M = \frac{M_1 V_1 + M_2 V_2}{V_1 + V_2}$$

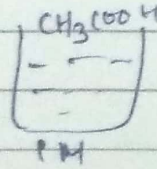


$$\text{molarity of } [A] = \frac{M_1 V_1}{V_1 + V_2}$$

$$\text{Molarity of } [B] = \frac{M_2 V_2}{V_1 + V_2}$$

Que : 1 Molar 2 litre aqua soln of CH_3COOH is mixed with 600 ml 10% w/v soln of aquas CH_3COOH then calculate final Molarity of CH_3COOH

Ans :



2 litre

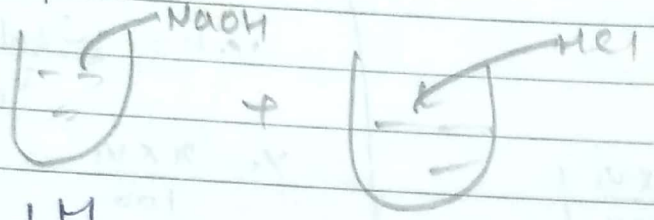
$$\%\frac{w}{V} = 10$$

$$\frac{600}{V} = 10$$

[3/2.6]

2 Mole. $\frac{w}{v} = \frac{w_{solute}}{600} \times 100 = 10$

* Case of Mixing if reacting mixtures are mixed.



1 M
2 Litre

2M
2 Litre

$NaOH + HCl \rightarrow NaCl + H_2O$
2 mol 4 mol — —
— 2 mol 2 mol 2 mol

$[HCl] : \frac{2}{4}$ $[NaCl] = \frac{2}{4}$ $[Cl^-] = \frac{2+2}{4}$ $[Na^+] = \frac{2}{4} = \frac{1}{2}$

Date: 17/05/17

Important

Semimolar = 1/2
Centimolar = 1/100
milimolar = 1/1000
decimolar = 1/10

Desi	10^{-1}	femto	10^{-15}
Centi	10^{-2}	atto	10^{-18}
mili	10^{-3}		
micro	10^{-6}		
nano	10^{-9}		
Pico	10^{-12}		

Note:

* If A liquid is put in a close container its hold eq° with its vapour at distant pressure exerted by vapour called vapour pressure of liquid

* Vapour pressure of liquid does not depend shape or size of container

Aq. tension: Represent

Vapour pressure of H_2O liquid is also called Aqueous tension