

date: 23/05/19
Lesson: Solution + Colligative Property.

Marks (3)

* Solution is the homogeneous mixture of two or more components in which indivisible loss their identity.

two type →

(1) Solute (2) Solvent

Binary

- True Solution → loss their identity and can't separate
[H₂O + Sugar]

- false solution → Suspension. not lose their identity.
[H₂O + oil]

→ If solution made up of 3 or four components then are called Ternary or Bin. Tetranary.

→ Homogeneous → the word
↓ ↓ Homogenous means
same-same composition

Handwritten note: the composition of components are equal in the solution

* Solvent → the component which is present in large amount in solution called solvent.

* Solute → the component which is present in less amount in solution called solute.

Classification of solution →

(i) On the Basis of Composition →

(A) Homogenous Solution →

When the composition of solute and solvent is similar in the solution.

Example → $[H_2O + NaCl]$ $[H_2O + C_6H_{12}O_6]$

(B) Heterogeneous Solution \rightarrow When
of the Solute and Solvent
is different

Example \rightarrow [H₂O + oil] [H₂O + metal]

(C) on the Basis of Amount of Solute

(A) Dilute Solution \rightarrow

Definition \rightarrow the Solution in which
the Amount of Solute
is much lesser than
Solvent

Example \rightarrow dil HNO₃ = HNO₃ < H₂O

(B) Concentrated Solution \rightarrow

Definition \rightarrow the Solution in which
the Amount of Solvent
is much lesser than Solute

Conc. = dil HNO₃ = HNO₃ > H₂O

(E) Saturated Solution. →

Definition: Those type of solution in which no more solute can be dissolve At certain temperature.

(D) unsaturated Solution →

Definition: the solution in which more solute can be dissolve at certain temperature till saturation.

(3) on the Basis of Physical state →

on the Basis of Physical state there are three type of Solution possible.

(The Physical state of any solution depend upon Solvent nature) Solution.

(A) Gaseous Solids → the Solution in which Solvent is gas.

Solvent	Solute	Example
G ₁	G ₁	Mix of O ₂ and N ₂
G ₁	L	CH ₄ in N ₂ G
G ₁	S	Camphor + N ₂

(a) liquid solution → the solvent in which solute is liquid

Solvent	Solute	Example
L	G	O ₂ in water
L	L	C ₂ H ₅ OH + H ₂ O
L	S	Sugar + H ₂ O

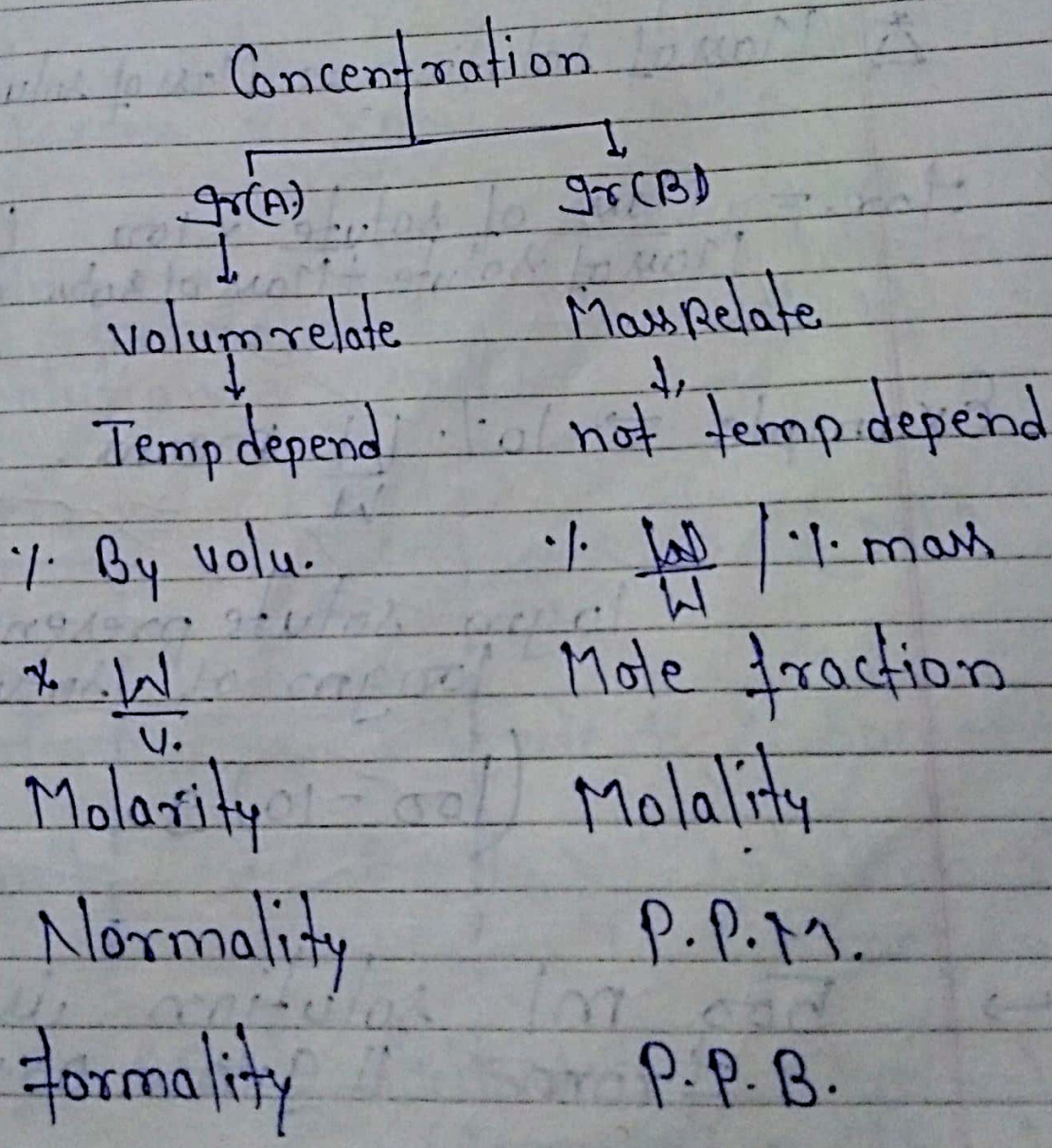
(b) Solid Solution → the solution in which solvent is solid.

Solvent	Solute	Example
S	G	Adsorption of H ₂ on the surface of Pt/Ni
S	L	* Ag-Hg (Amalgam)
S	L	Cu + Ag (Alloy)



* Concentration of solution

The composition of a solution can be expressed in terms of its concentration. "the amount of solute in which is dissolve in of specific amount of or volume of solution or solvent"



~~is mass related~~ $\frac{10\% \cdot W}{W} = \% \text{ mass}$

Definition: the mass or weight of solute present in gram which is 100gm of solution.
form. $\frac{\text{Mass of solute} \times 100}{\text{Mass of solution}}$

Δ Mass of solution = Mass of solu. + Mass of Solv.

form. = $\frac{\text{Mass of solute} \times 100}{\text{Mass of solute} + \text{Mass of solv.}}$ (gm)

Example $\rightarrow 10\% \frac{W}{W}$ means

10gm solute present in 100gm of solution

$(100 - 10) \cdot 90$

\rightarrow 500 ml solution is prepared from 11 gm oxalic

Acid density of solution is
 (1.1) g/ml find mass % of
 oxalic acid in the solution

Ans, $1.1 \times 300 = 330 \text{ gm}$

$$\frac{11}{330} \times 100 = 3.3\%$$

(2) Volume Percent

(B) Percent $\% = \frac{\text{Vol. of solute}}{\text{Vol. of solution}} \times 100$

Defination - Volume of solute in ml which
 are present in 100 ml of
 solution

form. $\rightarrow \frac{\text{V solute} \times 100}{\text{V solution}} \text{ (ML)}$

$\text{V solution} \rightarrow \text{V solute} + \text{V solvent}$

Example \rightarrow 25% V solution of
 Ethanol in H₂O

$$25 \text{ ML } \text{C}_2\text{H}_5\text{OH} = 100 \text{ mL soln}$$

$$(100 - 25) = 75 \text{ H}_2\text{O}$$

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(b) $\frac{W}{V}$ — the Amount
in the of solute or weight present
100 ml of solution

$$\text{for } \rightarrow \frac{\text{Weight of solute (gm)}}{V \text{ solution (ml)}} \times 100$$

Example \rightarrow 20% $\frac{W}{V}$ solution.

$$20 \text{ gm solute} = 100 \text{ ml sol.}$$

Δ Example \rightarrow How much gram NaCl will be required to obtain 500 ml solution of 2% $\frac{W}{V}$. RBSE (2018)

$$2\% \frac{W}{V} = \frac{\text{Amount of NaCl} \times 100}{500}$$

$$2 = \frac{x}{500} \times 100$$

$$2 \times 5 = 10 \text{ gm.}$$

Ques. → 10 gm Glucose is dissolve in 90 gm of water then what will be mass % of glucose
RASE (2016)

Ans Mass of Solution = 10 + 90 = 100 gm
$$\% \frac{W}{W} = \frac{100 \times 10}{100} = 10\%$$

Ques. → If 20 gm Sodium hydroxide is dissolve in 150 gm of water then what will be % Mass

$$\% \frac{W}{W} = \frac{W/A}{W_A + W_B} \times 100 = \frac{20 \times 100}{170} = 11.76$$

Ques. → 50 mL Methanol is dissolved in 150 mL of water. find out % mass

①
$$\% \frac{W}{W} = \frac{50}{50 + 150} \times 100 \Rightarrow$$

$$\frac{50}{200} \times 100 \rightarrow 25\% \text{ Mass}$$