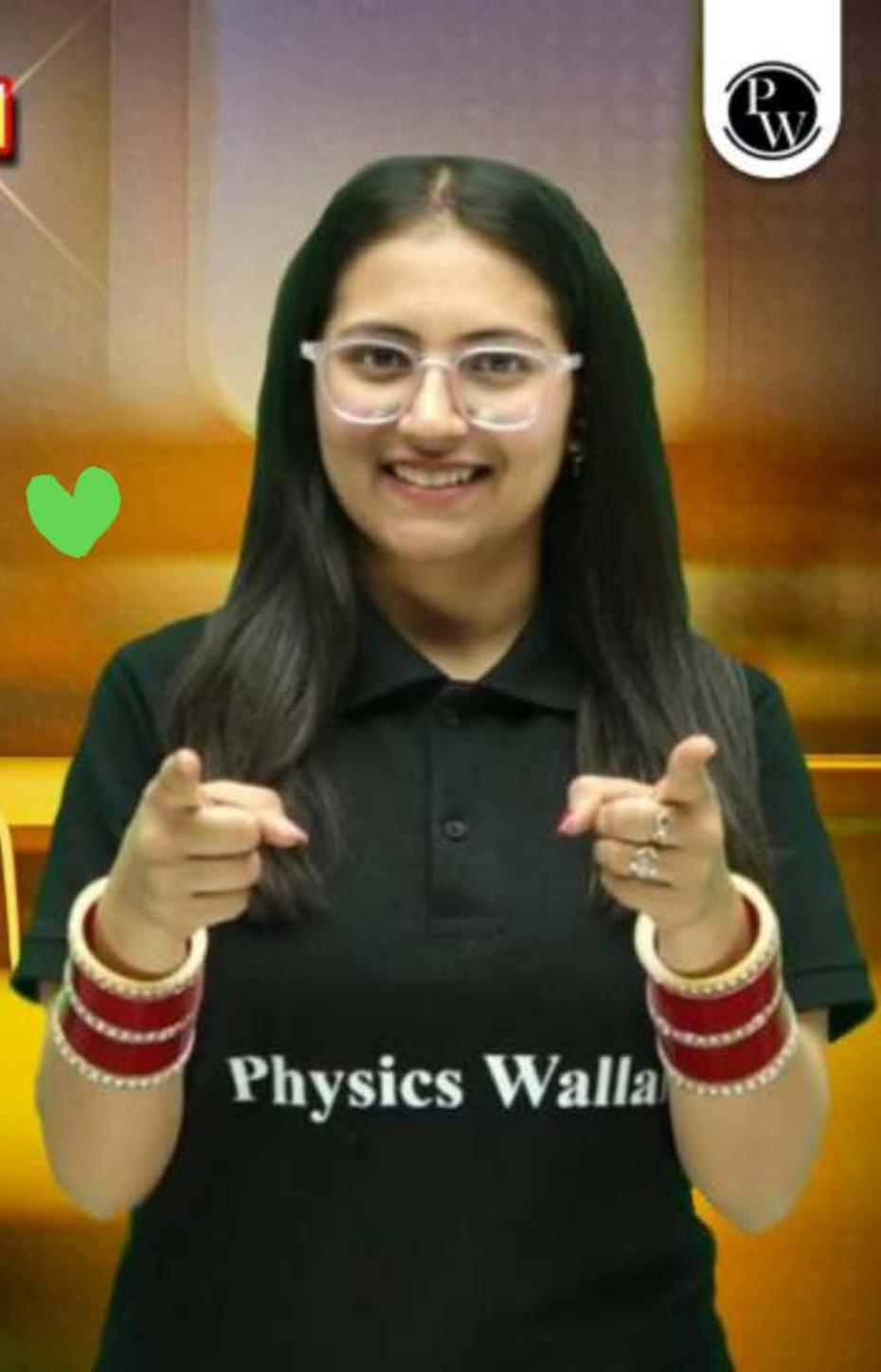
RADIANT 2026

Chemistry

Water

Lecture - 03

By- Bharti Ma'am



Topics *to be covered*

1. Type of solution (Revision)
2. Concentration terms
3. Solubility
4. Solubility curve

5) Sarurated, unsaturated, m/m%, m/v% ,v/v%, solubility

Quick-Revision

Component of Solution

Solute
(less amount)

Solvent
(large Amount)

Salt Solution

Solute : salt Solvent : H_2O

Features of a solution

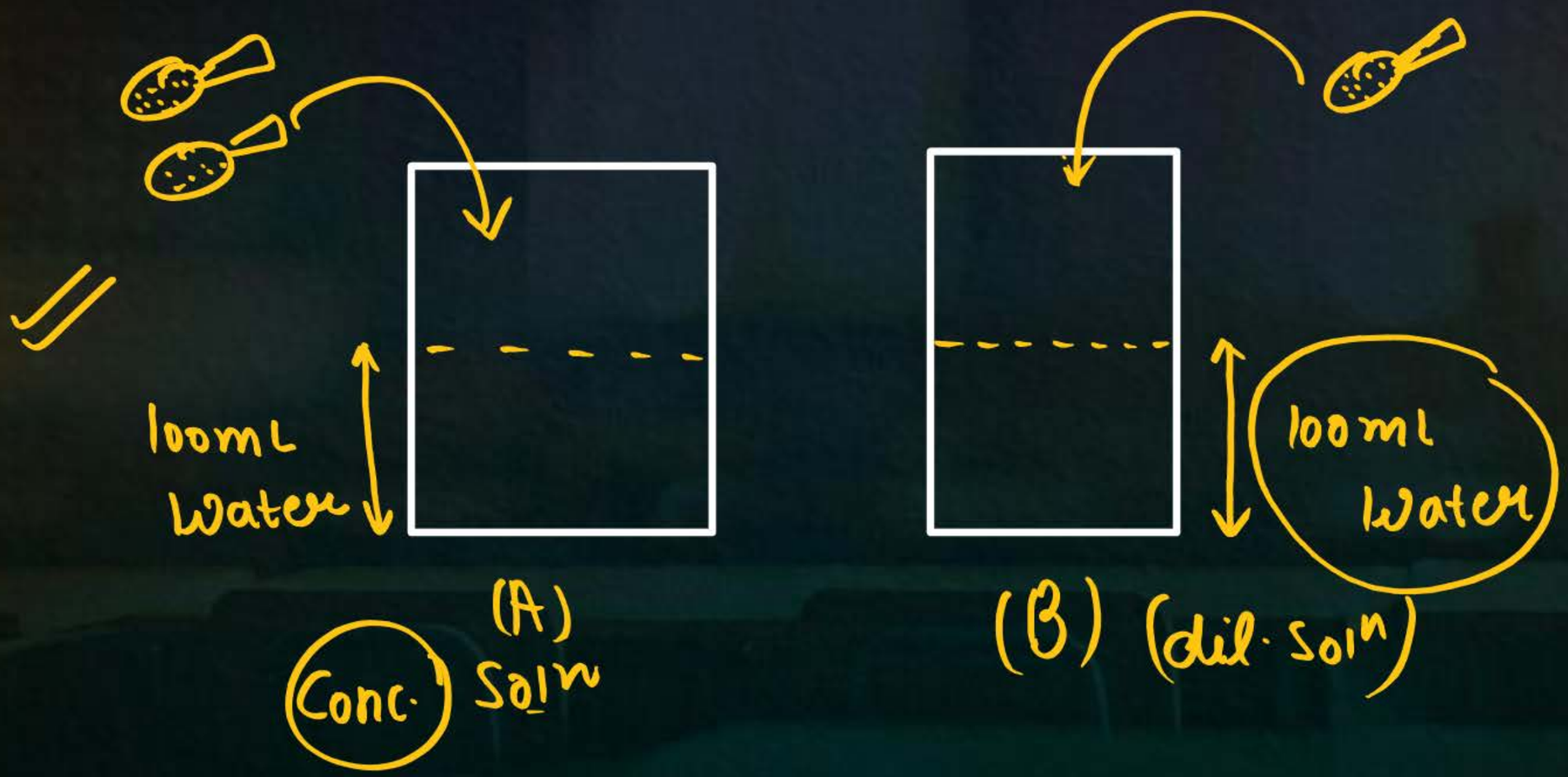
(Homogeneous mix) Homo: same

1. A solution better to call true solution is clear, transparent and homogenous in nature, i.e. total number of phase = 1.
2. The size of solute particles lies in the range of 10^{-8} cm and are invisible.
3. Components of mixture can not be separated by simple filtration.
4. Solute particles are not settled down but remain uniformly distribution in solution.

Dilute and Concentrated Solutions

1. **Dilute solution:**
   The solution in which the amount of solute is relatively small as compared to the amount solvent present in a given mass of it, is called a dilute solution.

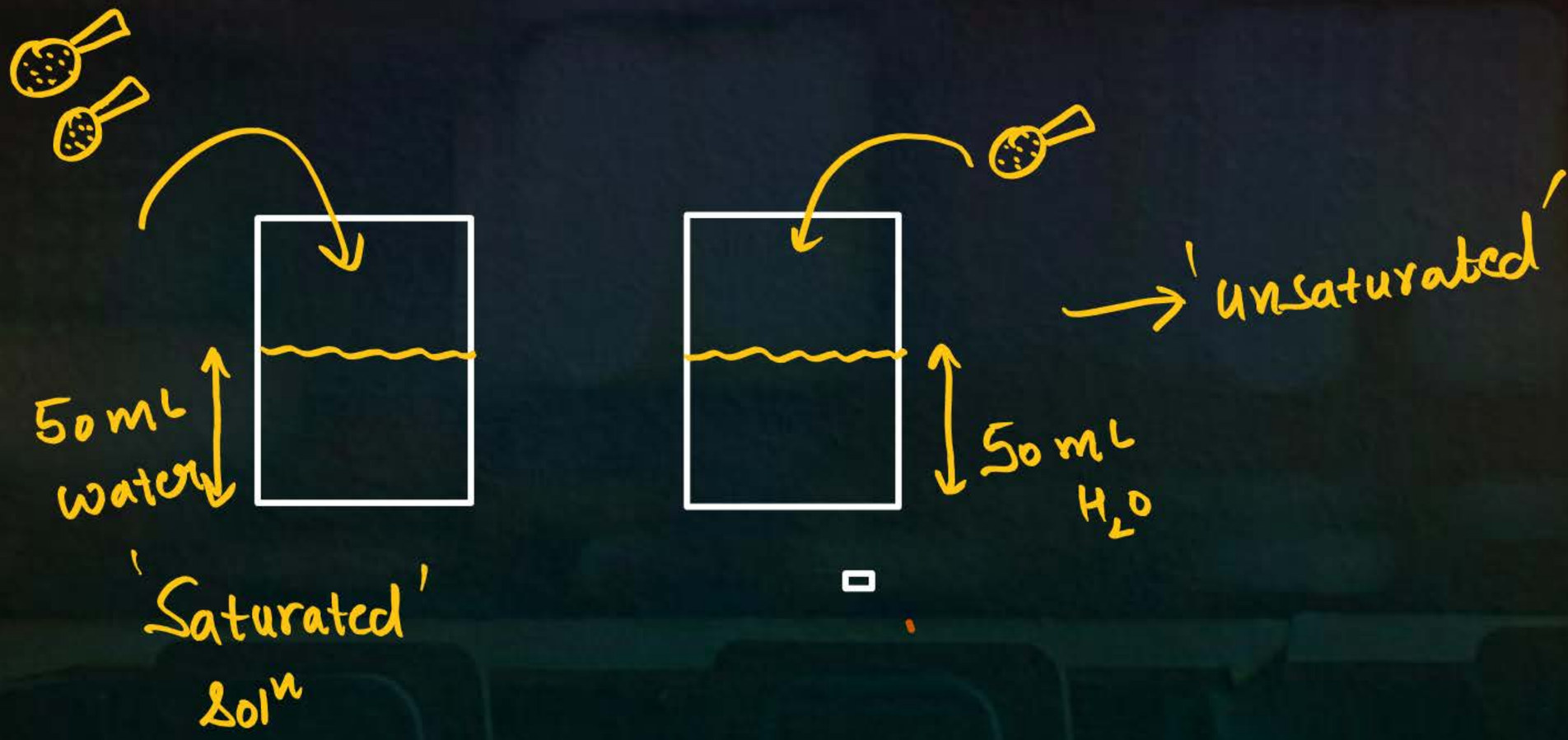
2. **Concentrated solution:**
   The solution in which the amount of solute is relatively large as compared to the amount of solvent in a given mass of it, is called a concentration solution.


100mL
Water
(A)
Conc. Soln
(B) (dil. Soln)
100 mL
Water

Unsaturated, Saturated and Supersaturated Solutions

1. Unsaturated solution:

A solution is said to be an unsaturated solution at a particular temperature if it can dissolve more of the solute at the same temperature.


50 mL
water
'Saturated'
Soln
'unsaturated'
50 mL
H_2O

Unsaturated, Saturated and Supersaturated Solutions

2. Saturated solution:

A solution is said to be a saturated solution at a particular temperature if no more of the solute can be dissolved in it at the same temperature.

Conversion of a Saturated solution to an unsaturated solution:

A saturated solution can be made unsaturated by following methods.

1. **By Heating :**

An increase in temperature usually increases the solubility of the most of the solute. Hand more solute can be dissolved in a saturated solution by heating.

Conversion of a Saturated solution to an unsaturated solution:

A saturated solution can be made unsaturated by following methods.

2. By Adding more solvent:

The extra added solvent can dissolve more of the solute at the same temperature. Hence, more solute can be dissolved in a saturated solution.

Supersaturated solution

A solution is said to be supersaturated at a particular temperature if it holds more of the solute than that required to be present in a saturated solution at the same temperature.

Concentration Terms

Concentration: → It is the amount of solute present in fix amount of soln

(a) m/m% OR w/w%

(b) V/V%

Concentration Terms

$\frac{x}{y}$ = $\rightarrow$ Solute ✓

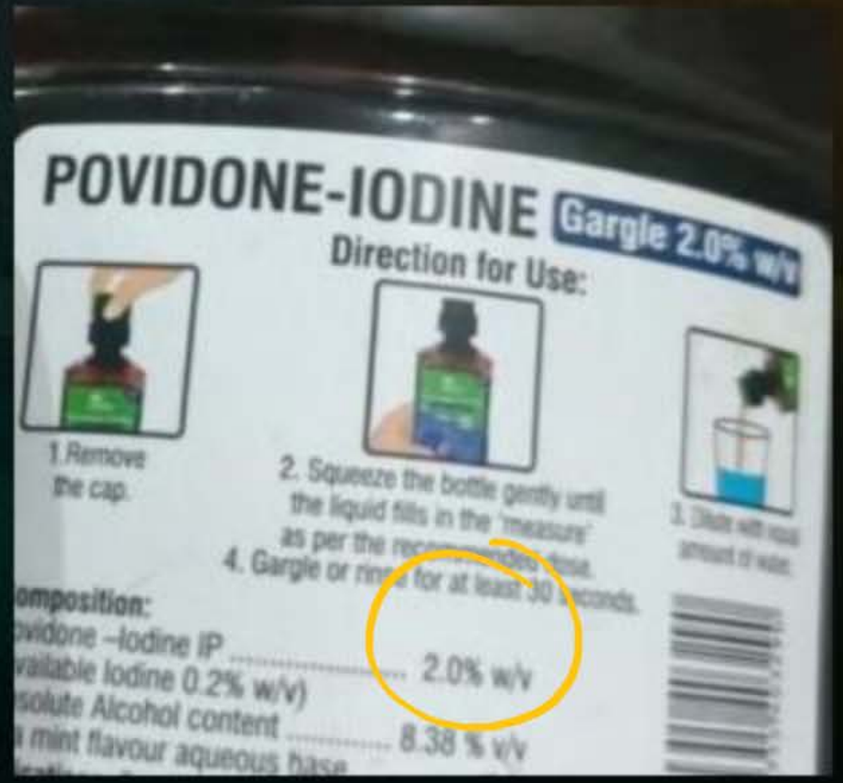
$\rightarrow$ solvent ✓

38% v/v Alcoral =

$$m/m\% = \frac{\text{Mass of Solute}}{\text{Mass of solution}} \times 100$$

Mass of solution = Mass of Solute + Mass of Solvent

8% m/m glucose ⇒ 8g of glucose in 100gr of Solution



8% m/m glucose solution:- 8g of glucose in 100g of solution}

1.) Mass of solute (glucose) = 8g

2.) Mass of solution = 100g

3.) Mass of solvent (water) = 100 - 8g = 92g

$$\%\ v/v = \frac{\text{Vol}^m \text{ of Solute}}{\text{Vol}^m \text{ of solution}} \times 100$$

$x/y \Rightarrow x = \text{Solute}$, $y = \text{solution}$

$$\text{Vol}^m \text{ of solution} = \text{Vol}^m \text{ of solute} + \text{Vol}^m \text{ of solvent}$$

10% v/v ethanol solution → 10ml of ethanol present in 100ml of soln

10% (v/v) $\Rightarrow$ 10 mL ethanol in 100 mL of solution

(a) Vol^{m} of Solute (Ethanol) = 10 mL

(b) Vol^{m} of solution = 100 mL

(c) Vol^{m} of solvent (water) = 90 mL

Question

2.5 litre of alcohol is present in 10 litres of aqueous solution of alcohol. Calculate the volume percent of the solution.

Volume of solute = 2.5 litres

Volume of solution = 10.0 litres

Soln

$$V/V\% = \frac{\text{Vol}^{M} \text{ of solute}}{\text{Vol}^{M} \text{ of soln}} \times 100$$

HW

Question

50 gram of sugar is dissolved in 2.45 kg of water. Calculate the concentration of solution. m/m%

Soln :- Sugar (solute) = 50 g

Solvent (water) = 2.45 kg ⟷ 2450 g

$$m/m\% = \frac{\text{Mass of solute}}{\text{Mass of soln}} \times 100$$

$$= \frac{50}{50 + 2450} \times 100 = 2\%$$

Solubility ⇒ Max. amount of solute dissolved

- The solubility of a solute in a particular solvent at a particular temperature is the maximum amount of the solute dissolved in 100 g of the solvent to form a saturated solution at that temperature.

- The solubility of a solid is usually expressed the mass of the solute (in grams) dissolved per 100 mL of the solvent. It may also be expressed as $g\ L^{-1}$.


THANK
you