

CHAPTER NO 07

SOLUTION AND SUSPENSION:

Q1. Define Solution, Solute, Solvent and Suspension.

SOLUTION:

"A homogenous mixture of two or more substances is called Solution."

Example:

Salt and water uniformly mixed to form a solution.

SOLUTE:

"A part of a solution which is present in less quantity is called Solute."

Example:

Sugar and salt are used as solute in a solution.

SOLVENT:

"A part of solution which is present in large quantity is called Solvent."

Example:

Water is used as solvent in aqueous solution.

SUSPENSION:

"A heterogeneous mixture of two or more substances is called Suspension."

Example:

Sand and water don't mix with each other so, a suspension (mud) is formed.

Q2. What is aqueous solution? Define the types of aqueous solution.

AQUEOUS SOLUTION:

"A solution which contains water as a solvent is called Aqueous solution."

TYPES OF AQUEOUS SOLUTION:

Following are the types of aqueous solution.

i. Unsaturated Solution

ii. Saturated Solution

iii. Super Saturated Solution

iv. Concentrated Solution

v. Dilute Solution

UNSATURATED SOLUTION:

"Unsaturated solution is a solution which contains less amount of solvent at room temperature".

SATURATED SOLUTION:

“Saturated solution is a solution which contains maximum amount of solute than its required capacity at room temperature.”

SUPER SATURATED SOLUTION:

“When saturated solution is heated more amount of solute can be dissolved in it after heating. This solution is called Super saturated solution.”

CONCENTRATED SOLUTION:

“Concentrated solution is a solution which contains more amount of solute than other solutions.”

DILUTE SOLUTION:

“Dilute solution is a solution which contains less amount of solute than other solutions”.

Q3. Draw a table to show different examples of solution with solute and solvent.

S.NO.	SOLUTE	SOLVENT	EXAMPLES
1.	Gas	Gas	Air (mixture of 78% N ₂ , 21% O ₂ and 1% others gases.)
2.	Gas	Liquid	Carbonated soft drink such as coca-cola, bubble-up etc. NH ₃ gas in water and air dissolved in water.
3.	Gas	Solid	H ₂ gas absorbed over palladium metal.
4.	Solid	Gas	Clouds (water vapours in air), steam.
5.	Solid	Liquid	Alcohol in water, water in milk, milk in tea, vinegar(acetic acid in water)
6.	Solid	Solid	Amalgam (mercury in sodium) and water in jelly powder.
7.	Liquid	Gas	Smoke (carbon particles in air)
8.	Liquid	Liquid	Sugar in water, sea water
9.	Liquid	Solid	Alloys such as brass (copper and zinc) bronze(copper and tin), steel (carbon and iron)

Q4. What is Solubility? Write its formula. What are the factors which effect on solubility? Define each.

SOLUBILITY:

“Amount of solute dissolved in 100 gm of solvent at a particular temperature to produce a saturated solution is known as solubility.”

Formula:

$$\text{Solubility} = \frac{\text{Mas of solute}}{\text{Mass of solvent}} \times 100$$

FACTORS AFFECTING ON SOLUBILTY:

Following are the factors which affect on solubility.

i. Temperature

ii. Pressure

iii. Nature and solute and solvent

TEMPERATURE:

Solubility of a solid into liquid increases with increase in temperature and solubility of gases into liquid decreases with increase in temperature.

Example:

The solubility of potassium chloride (KCl) increases with temperature.

PRESSURE:

Solubility of gases in liquid increases with increase in pressure and decreases with decrease in pressure. The solubility of solid and liquid are not affected by pressure.

NATURE OF SOLUTE AND SOLVENT:

Polar and ionic solutes easily dissolve in polar solvents while non polar solutes easily dissolve in non-polar solvents it is said that:

“Like dissolves like”

Q5. State Henry's law.

HENRY'S LAW:

INTRODUCTION:

In 1803 an English chemist William Henry presented this law.

Statement:

“The solubility of gases in liquid is directly proportional to the pressure of gas.”

Mathematically:

$$m \propto P$$

$$m = KP$$

Q6. Define crystals and crystallization.

CRYSTALS:

“Crystals are homogeneous solid having regular and definite geometrical shape with faces and sharp edges.”

CRYSTALLIZATION:

“The process in which dissolved solute comes out of solution and forms crystal called crystallization.”

Q7. Write difference between solution and suspension.

	SOLUTION	SUSPENSION
01	The size of particles is between 0.1 to 1nm	The size of particles is large than 1000nm
02	Particles cannot be seen with low power microscope	Particles can be seen with low power microscope
03	It is homogeneous	It is heterogeneous
04	Particles do not settle down	Particles settle down
05	It is transparent	It is not transparent
06	Components cannot be separated by filtration	Components can be separated by filtration

Q8. Write down some examples of suspension in daily life.

EXAMPLES OF SUSPENSION IN DAILY LIFE:

1. SMOKE:

A suspension of the particles of carbon in gas or air.

2. MUD:

A suspension of fine particles of solid in small quantity of liquid.

3. FOAM (FROTH):

A suspension of fine particles of a gas in a liquid

4. EMULSION:

A suspension of droplets of one liquid into another in which it is not soluble.

Q9. Name the solute and solvent present in the following solutions.

Syrup, Dust or Haze, Butter, Fog, Foam, Jelly, Smoke, Sodium Amalgam, Cheese, Mist.

SOLUTIONS	SOLUTE	SOLVENT
Syrup	Sugar	Water
Dust or haze	Dust	Air
Butter	Fats	Water
Fog	Water vapor	Air
Foam	Air	Water
Jelly	Fruit pulp	Water
Smoke	Carbon particles	Air
Sodium amalgam	Mercury	Sodium
Cheese	Fats	Water
Mist	Water vapor	Air

Q10. Write difference between Molarity and Molality.

	MOLARITY	MOLALITY
01	Number of moles of solute present in 1dm³ of solution is called Molarity	Number of moles of solute present in 1kg of solvent is called Molality
02	It is denoted by "M"	It is denoted by "m"
03	The formula of Molarity is $M = \frac{\text{No. of moles of solute}}{\text{Vol of sol in dm}^3}$	The formula of Molality is $M = \frac{\text{No. of moles of solute}}{\text{Solvent in kg}}$

Q11. Numericals