

SOLUTIONS & COLLIGATIVE PROPERTIES

INTRODUCTION

In normal life we rarely come across pure substances. Most of these are mixtures containing two or more pure substances. Their utility or importance in life depends on their composition. The air around us is a mixture of gases primarily oxygen and nitrogen; the water we drink contains very small amounts of various salts dissolved in it. Our blood is a mixture of different components. Alloys such as brass, bronze, stainless steel, etc. are also mixtures. In this Unit, we will consider mostly liquid solutions and their properties.

1. SOLUTIONS

1.1 Definition

A solution is a homogeneous mixture of two or more than two components.

For example, common salt in water.

1.2 Classification

Solutions which contain two components in it are called **Binary Solutions**.

Substances which are used to prepare a solution are called as **Components**.

The component that is present in the largest quantity is known as **Solvent**. Solvent determines the physical state in which solution exists.

The other component present in lesser quantity in the solution is termed as **Solute**.

Each component may be solid, liquid or in gaseous state.

Type of Solution	Solute	Solvent	Common Examples
Gaseous Solutions	Gas	Gas	Mixture of oxygen and nitrogen gases
	Liquid	Gas	Chloroform mixed with nitrogen gas
	Solid	Gas	Camphor in nitrogen gas
Liquid Solutions	Gas	Liquid	Oxygen dissolved in water
	Liquid	Liquid	Ethanol dissolved in water
	Solid	Liquid	Glucose dissolved in water
Solid Solutions	Gas	Solid	Solution of hydrogen in palladium
	Liquid	Solid	Amalgam of mercury with sodium
	Solid	Solid	Copper dissolved in gold

1.3 Strength of Solutions

The amount of solute dissolved per unit solution or solvent is called Strength of solution. There are various methods of measuring strength of a solution. :

1. Mass Percentage (%w/w):

"It represents mass of a component present in 100 g of solution"

$$\text{Mass \% of a component} = \frac{\text{Mass of component in the sol.}}{\text{Total Mass of sol.}} \times 100$$

2. Volume percentage (%v/v):

"It represents volume of a component in 100 mL of solution"

$$\text{Vol. \% of a component} = \frac{\text{Vol. of component}}{\text{Total vol. of solution}} \times 100$$

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