Introduction

- A **solution is a homogeneous mixture** of two or more substances at molecular or ionic levels.
- Formation of solution is a physical change single phase exists in solution.
  Individual molecules or ions will exist in solution.
  Components of true solution can not be separated by filtration, settling, centrifugation.
- Solute may lose it's physical state, but solvent retains it's physical state.
- Based on the number of components, solutions may be binary, ternary, quaternary etc,.
- A binary solution contains only two components known as solute and solvent.
  Solute + Solvent = Solution
- The substance present in smaller proportion in binary solution is known as the solute.
  The solute is called the dissolved component (or) dispersed component in the solution.
- The substance present in larger proportion is called as the solvent.
  The solvent is called the dissolving component (or) dispersion medium in the solution.
- In case of solid in liquid type solutions, irrespective of their amounts, solid is solute and liquid is solvent.
- Based on the physical state, solutions are of 3 types.
  Gaseous solution : Solvent is Gas
  The liquid solutions : Solvent is Liquid
  Solid solutions : Solvent is solid
- In any type of solution the solute may be gas or liquid or solid.
- Solutions are of 7 types based on the physical states of solute and solvent.
  1) Gas in gas : Mixture of any two gases
  2) Gas in liquid : Soda water
  3) Liquid in liquid : Alcohol in water
  4) Solid in liquid : Sugar in water
  5) Gas in solid : H_2 occluded in Pd
  6) Liquid in solid : Amalgams
  7) Solid in solid : Alloys
- Liquid in gas and solid in gas are not considered as true solutions as they are not homogenous.
- A solution in which water is used as a solvent is known as aqueous solution.
- A solution in which alcohol is used as a solvent is known as alcoholic solution.
- A solution in which an organic liquid is used as a solvent is known as non – aqueous solution.
- The commonly used solvents in non – aqueous solutions are CCl_4, CS_2, $CHCl_3$, C_6H_6 liquid

SO_2, acetic acid , liquid NH_3 etc.

- Based on the amount of dissolved solute, solutions are of 3 types.

  I) *Saturated solutions :* which can not dissolve any more solute. Usually some amount of undissolved solute is present in it.

  A dynamic equilibrium exists between dissolved solute and undissolved solute.

  II *unsaturated solutions :* which can dissolve some more amount of solute.

  No excess of undissolved solute exists.

  No dynamic equilibrium exists.

  III) *Super saturated solutions :* which contain excess of dissolved solute.

  No equilibrium exists. These are unstable.