Introduction

The force of attraction between atoms or ions is called chemical bond.

- Chemical bonds are of many types
  a) Ionic bond
  b) Covalent bond
  c) Co-ordinate covalent bond
  d) Metallic bond, etc.
- Formation of chemical bonds involved electrons & nuclei and mainly energy changes.
- Bond formation is exothermic & bond breaking is endothermic.

  $H + H \rightarrow H - H + 104$ k.cal

  $H - H \rightarrow H + H - 104$ k.cal
- Bonds are formed between atoms or ions to gain stability.
- In the bond formation, some energy is released & potential energy of system decreases.
- The two bonded atoms are at optimum or equilibrium distance. So that the attractive & repulsive forces are balanced.
- If the bonded atoms approach much closer beyond the equilibrium distance, the repulsive forces will exceed the attractive forces.
- In exothermic reaction, the number of bonds formed in the products is greater than number of bonds broken in the reactants (or)
- Strong bonds are formed in the products & weak bonds are broken in the reactants.
- Molecules are more stable than individual atoms.

Electronic Theory of Valency: -

- This was proposed by Kossel & Lewis.
- This theory explains how & why the bonds are formed.
- Valence electrons are responsible for bonding process.
- Inert gases have $ns^2\ np^6$ configuration but, Helium has $1s^2$. Thus, all inert gases have octet & helium has duplet configuration.
- Noble gases are chemically inert & will not take part in bonding because they are stable due to octet configuration in the valence shell.
- Atoms of all other elements contain less than 8 electrons in valence shell.

  $\therefore$ These elements are chemically reactive & take part in chemical reactions to become stable by attaining octet configuration.
- Attaining octet configuration in the valence shell is called octet rule or octet theory.
- Some elements may become stable by attaining duplet configuration e.g. H, Li, Be.

- Octet configuration can be achieved by loosing or gaining or mutual sharing of electrons.

  As per this theory, core electrons will not take part in bonding.

  Atom - Valence = Core

VALENCE or VALENCY:

It is the combining capacity of an element i.e., number of bonds formed by the element.

Valence of an element = group number or (8 - group number)