Language of Chemistry

Chemical reaction and its types

1. Chemical reaction is a process in which a chemical substance gets converted into another substance with new and changed properties.

2. Chemical reactions are of two types:

(i) Simple chemical reaction: Usually occurs in one step and can be explained in detail. For example: Burning of fuel

(ii) Complex chemical reaction: Usually occurs in multiple steps and cannot be explained in detail. For example: Biochemical reactions

3. Chemical reactions are responsible for the formation of new substances that are very important in our lives.

4. A chemical reaction occurs because unstable atoms tend to attain maximum stability by completing their octet or achieving noble gas electronic configuration.

Valence electrons

1. The electrons which take part in a chemical reaction are called valence electrons.

2. Valence electrons may be present in the last orbit or in the penultimate orbit.

3. Valence electrons may be gained orlost or can be shared between two or more atoms during chemical reactions.

4. When atoms acquire noble gas configuration, they become stable and do not react further at ordinary conditions.

A chemical reaction can be characterised by:

1. Evolution of gas
2. Change of colour
3. Change of state
4. Formation of precipitate

- **Catalysis** is the process in which the rate of a chemical reaction is either increased or decreased by a chemical substance known as a **catalyst**.
  Negative catalyst or inhibitor is a substance that slows down the rate of reaction. It retards the efficiency of a catalyst.

- Photochemical reactions are the reactions that proceed with absorption of light energy. Example-**Photosynthesis**
- **Some chemical reactions proceed only when the reactant molecules are brought together in close contact with each other. The intimate contact can be brought by**

1. **grinding the reactants together**
2. dissolving the reactants in water

- Certain chemical reactions proceed only when an electric current is passed through reactants in fused state or in aqueous solution.
  Example: Acidulated water decomposes into hydrogen and oxygen only when electric current is passed.

- Certain chemical reactions proceed only when reactants are heated together while certain chemical reactions proceed when reactants are exposed to sunlight or diffused sunlight or when reactants are subjected to a pressure higher than atmospheric pressure.

A **chemical equation** is the symbolic representation of a chemical reaction in the form of chemical formulae, signs, symbols, and directions. In which the reactant entities are given on the left-hand side and the product entities on the right-hand side.

- **Balanced chemical equation**

Reactants → Products

LHS RHS

Total number of atoms on the LHS = Total number of atoms on the RHS

- How to balance an equation

- Write reactants and products
- Balance the maximum number of a particular atom on both sides
- Balance other atoms
- A complete balanced equation should look like

  $$CO\ g + 2H2\ g \rightarrow^{340\ atm} CH3OH\ l$$