Atoms, Molecules and Radicals

- **Atoms**

- **According to Dalton's atomic theory**
  - Matter is made up of very tiny particles and these particles are called atoms.
  - Atoms cannot be divided further i.e., atoms are indivisible
  - An atom can be defined as the smallest particle of matter that can neither be created nor destroyed by chemical means.

- **Molecule**
  - A molecule is formed when two or more atoms of the same element or different elements get combined chemically.
  - The number of atoms that combine to form a molecule is called the atomicity of the molecule.

- **Ion**
  - An ion is a charged species in which an atom or a group of atoms possess a net electric charge (positive or negative).
  - Positively charged ions are called cations (basic radical) and negatively charged ions (acidic radical) are called anions.
  - Compounds in which molecules are formed by the combination of cations (positively charged ions) and anions (negatively charged ions) are known as ionic compounds.

- Valency is defined as the combining capacity of the atom of an element. Valency of an element depends upon the number of electrons present in the outermost shell of its atom.
- The combining capacity of an element is known as its **valency**.

- It has been observed that certain metals exhibit more than one valency. In such a situation, metals are said to exhibit variable valency.

- **Chemical formula**
  - A chemical formula is the representation of the composition of a molecule in terms of the symbols of elements present in that molecule.
- **Molecular formula** is a **chemical formula** that indicates the kinds of atoms and the numbers of each kind of atom in a molecule of a compound.

- To write the chemical formula of a compound, one should have prior knowledge of two things.

  - **The symbols of the constituent elements.**
  - **The combining capacity of the atom of each element constituting the compound.**