## SOME BASIC CONCEPTS OF CHEMISTRY DALTON'S ATOMIC THEORY

## ✤ DALTON'S ATOMIC THEORY

The concept that matter is composed of very small particles was given by Indian and Greek philosophers. As early as 400 to 500 B.C. the Greek philosopher Democritus suggested that matter cannot be forever divided into smaller and smaller parts. The ultimate particles were considered as indivisible. These particles were called atoms. The word atom has been derived from the Greek word 'atoms 'meaning 'indivisible'. These early ideas, however, were not based on experiments but were mere speculations. The existence of at' Oms was accepted by Boyle in his book 'The Skeptical Chemist' (1661) and by Newton in his books ' Principia' and 'Optics ' (1704). The 'Old ideas were put 'On a scientific scale by John Dalton in the years 1803 to 1808 in the form of a theory known as Dalton's Atomic Theory which is a landmark in the history of chemistry.

The main points of Dalton's atomic theory are:

(i) Elements consist of minute, indivisible, indestructible particles called atoms.
(ii) Atoms of an element are identical to each other. They have the same mass and size.
(iii) Atoms of different elements differ in properties and have different masses and sizes.
(iv) Compounds are formed when atoms of different elements combine with each other in simple numerical ratios such as one-to-one, one-to-two, two-to-three and soon.
(v) Atoms cannot be created, destroyed or transformed into atoms of other elements.
(vi) The relative numbers and kind of atoms are always the same in a given compound. The theory convincingly explained the various laws of chemical combination, but the theory has undergone a complete shake up with the modem concept of structure of atom. However, the Daltonian atom still retains its significance as the unit participating in chemical reactions.

The following are the modified views regarding Dalton's atomic theory:

- (i) The atom is no longer supposed to be indivisible. The atom is not a simple particle but a complex one.
- (ii) Atoms of the element may not necessarily possess the same mass but possess the same atomic number and show similar chemical properties (Discovery of is topes).
- (iii) Atoms of the different elements may possess the same mass but they always have different atomic numbers and differ in chemical properties (Discovery of isobars).

- (iv) Atoms of one element can be transmuted into atoms of another element. (Discovery of artificial transmutation).
- (v) In certain organic compounds, like proteins, starch, cellulose, etc., the ratio in which atoms of different elements combine cannot be regarded as simple. There are a number of compounds which do not follow the law of constant pro Rortions. Such compounds are called non- stoichiometric compounds