Molecules

- A combination of atoms is called a molecule. The forces which hold the atoms together in a molecule are called covalent bonds.
- A molecule is the smallest particle of a substance which has the properties of that substance and can exist in the free state.

  There are two types of molecules.

Molecules of elements

The molecule of an element contains two (or more) similar atoms chemically combined together.

Ex. A molecule of hydrogen element contains 2 hydrogen atoms combined together, and it is written as H_2.

Molecules of compounds

The molecule of a compound contains two (or more) different types of atoms chemically combined together

Ex. Hydrogen chloride is a compound. The molecule of hydrogen chloride (HCl) contains two different types of atom. Hydrogen(H) and chlorine atom (Cl)

Molecules of some compounds

Compound	Combining elements	Formula	Ratio by mass
Water	Hydrogen and oxygen	H_2O	1:8
Ammonia	Nitrogen and Hydrogen	NH_3	14:3
Carbon dioxide	Carbon and Oxygen	CO_2	3:8

Atomicity

The number of atoms present in one molecule of an element is called its atomicity.

Ex. Noble gases (helium, neon, argon, krypton, etc.) have one atom each in their molecules such as He, Ne, Ar and Kr. So, the atomicity of noble gases is 1.

Ex. Hydrogen (H_2), nitrogen (N_2), oxygen (O_2), chlorine (Cl_2), bromine (Br_2), and iodine (I_2), all have 2 atoms each in their molecules. So, the atomicity of hydrogen, nitrogen, oxygen, chlorine, bromine and iodine is 2 each.

➢ Ions

An ion is a positively or negatively charged atom (or group of atoms). An ion is formed by the loss or gain of electrons by an atom, so it contains an unequal number of electrons and protons.

Ex. Sodium ion Na^{+}, magnesium ion Mg^{2+}, chloride ion Cl^{-}, and oxide ion O^{2-}.