CHAPTER-3 CLASS-X

METAL AND NON-METALS

We know that elements are pure form of matters. It may be defined as, "the pure form of matter made up of same types of particles."

Elements are classified into three types.

1. Metals
2. Non-metals
3. Metalloids

1. **Metals** – The elements having tendency to form positive ion by losing or donating electrons are called metals.

EXAMPLES – Li, Be, Na, K, Cu, Fe, Zn, Ca, Al, Au, Ag, Hg, U etc.

2. **NON-METALS** – The elements having tendency to make negative ion by gaining or accepting electrons are called non-metals.

EXAMPLES – C, N, O, F, Cl, Br, I, S, P, H, He, Ne, Ar etc.

3. **METALLOIDS** – The elements which show some properties of metals and some properties of non-metals are called metalloids.

EXAMPES – Boron, Silicon, Germanium, Antimony, Tellurium (Te), Polonium (Po), Astatine (Sb).

Physical properties of metals—

Followings are the physical properties of metals.

1. Metals are malleable. It means metals can be beaten into thin sheets without breaking.

When a piece of metal is beaten with hammer, it is converted into thin sheet, i.e, malleability is an important characteristic prop. of metals. Gold and silver are highly malleable metals. Sheets of Al is used for packing food, chocolate, medicines etc. Sheet of Cu is used for making utensils and sheet of iron is used for making boxes, buckets, drums etc.

2. Metals are ductile. Ductility is an important characteristic property which allows the metals to be drawn into thin wires. Most of the metals are ductile. Gold is the most ductile metal (1 gm gold → 2 km long wire). Cu and Al wires are used as electric wire. Tungesten wire is used as filament in electric bulb. Iron wire (wire gauze).

3. Metals are good conductor of heat. Metals allow heat energy to pass through them. Ag metal is the best conductor of heat. Cu and Al are very good conductor of heat, due to this Cu and Al metals are used to make cooking utensils, water boilers. Lead metal is poorest conductor of heat. Hg is also poor conductor of heat.

4. Metals are good conductor of electricity. Metals electricity to pass through them. Ag is the best conductor of electricity. Electric wires are made by Cu and Al, because they are very good conductor of electricity.

5. Metals are lustrous (shiny) and can be ~~polished~~ polished. Metals have shiny surface. It is called metallic lustre. Due to metallic lustre, gold and silver are used for making jewellery.

Metals loose their lustre on keeping in air for a long time due to formation of a thin layer of oxide, carbonate or sulphide.

6. Metals are generally hard. Most of the metals are hard. Hardness of ~~m~~ varies from metal to metal. Na and K are soft metals and can be cut easily with a knife.

7. Metals are strong. Generally metals are strong, it means tensile strength of metals is very high, i.e, metals can hold large ~~weights~~ weights without breaking (snapping). Iron metal is used in the construction of bridges, buildings, railway lines, girders, machines, chains. But Na and K are not strong.

8. Metals are solid at room temperature. The only metal Hg (mercury) is liquid at room temp.

9. Metals have high melting and boiling points. Melting point of iron is 1535°c, Cu metal has high m.p. 1083°c

Na and K metals have low melting points (about 98°c & 64°c), Gallium (30°c) Cesium (28°c)

10. Metals have high densities. Metals are heavy substances. Density of iron is 7.8 gm/cm³.

Sodium and potassium have low densities, 0.97 gm/cm³ and 0.86 gm/cm³ respectively.

11. Metals are sonorous. It means metals produce ringing sound on striking. So metals are used to make bells, strings of musical instruments like Sitar, violin.

12. Metals usually have a silver or grey colour. But Cu has a reddish-brown and gold has a yellow colour.