Chapter – 14
Chemical Effects of Electric Current

Materials through which electric current can pass through easily are called conductors of electricity. Electrical conductivity is a measure of the ability of a substance to allow the flow of an electric current. Among solids metals and graphite are good conductors of electricity which have high electrical conductivity. Some liquids are also good conductors.

Pure water or distilled water is a poor conductor of electricity. But the presence of even small amount of impurities(salts and minerals) makes water a good conductor as it contains ions through which conduction takes place. Hence water from taps, wells, ponds, rivers, seas, lakes, etc. conduct electricity as they contain impurities.

Most liquids that conduct electricity are solutions of acids, bases and salts. When electricity is passed through a conducting solution, the molecules of the solution dissociate into ions. Ions are atoms or group of atoms with a positive or a negative charge. These ions cause electrical conduction through the liquid. A liquid That conducts electricity due to the presence of ions is called an electrolyte.

Electrolysis:

The process of decomposition of a chemical compound in a solution when an electric current passes through it is called electrolysis. This process is due to the chemical effect of electric current.

Two electrodes are inserted in the solution and are connected to the terminals of a battery with a switch in between. This arrangement is called an electrolytic cell. The electrode that is connected to the positive terminal of the battery is called the anode, and the other connected to the negative terminal is called the cathode.

Electrolysis is used in refining and extraction of metals from impure samples. This process is called electrorefining. It is also useful in coating one metal with another. This process is called electroplating.

The passage of an electric current through a conducting solution causes chemical reactions. This is known as the chemical effect of electric current. Some of the chemical effects of electric current are the following:

- Formation of bubbles of a gas on the electrodes
- Deposition of metal on electrodes
- Change in colour of solutions

Electroplating: The process of depositing a layer of any desired metal on another material by means of electricity is called electroplating.

The object to be electroplated is made the cathode (negative electrode) by connecting it to the negative terminal of the battery. The metal which has to be deposited is made the anode (positive electrode) by connecting it to the positive terminal of the battery. The electrolyte is usually a salt solution of the metal to be coated.

Application of Electroplating:

(i) Metals that rust are often coated with other metals to prevent rusting.
(ii) Chromium plating is found on bath taps, car bumpers, etc. to give a bright attractive appearance and resist scratches and wear.
(iii) Silver plating is done on cutlery and jewellery items.
(iv) Tin cans, used for storing food, are made by electroplating tin onto iron. Tin is less reactive than iron. Thus, food does not come into contact with iron and is protected from getting spoilt.