ELECTRICITY
Introduction of Electricity

ELECTRICITY:

Electricity has an important role in modern society. In a span of more than 100 years, electricity has indeed, developed from a mere experimental activity in the laboratory into one of the most convenient and widely used forms a energy in the world. One of the practical advantages of electricity as a form of energy, is that it can readily transmitted over considerable distance with relatively small loss in energy. This makes it possible to supply electricity from a central generating plant to any location.

ELECTRIC CHARGE:

When we run our shoed across a carpet and reach for a metal doorknob, we can be zapped by an agoing spark of electricity. The answers to this lie in the branch of Physics called Electrostatics. The word electricity comes from the Greek word electron, which means "amber." Amber is petrified tree resin and it was well known to the ancients that if we rub an amber rod with a piece of cloth, the amber attracts small pieces of dry leaves or paper. A piece of hard rubber, a glass rod or a plastic comb rubbed with cloth also display this "amber effect" or static electricity or frictional electricity as we call it today.
Experiments show that there are exactly two kinds of electric charges:
(i) Negative charge
(ii) Positive charge
This also shows that unlike charges attract each other while like charges repel each other.
The S.I. unit of electric charge is coulomb. It is denoted by symbol **C**

Conductors and Insulators:

In some substances, the electric charges can flow easily while in other they cannot. S, all the substances can be divided mainly into two electrical categories: Conductors and insulators.

(i) **Conductors:** Those substances through which electric charges can flow, are called conductors. But the flow of electric charges is called electricity. All the metals like silver copper and aluminum etc., are conductors. Carbon, in the form of graphite, is a conductor an the aqueous solution (water solution) of salts are also conductors. The human body is a fairly good conductor. All the conductors (like metals) have some electrons which are loosely held by the nucleus of their atoms. These electrons are called "free electrons" and can move from one atom to another atom throughout the conductor. The presence of "free electrons" in a substance makes it a conductor of electricity.

(ii) **Insulators:** Those substances through which electric charges cannot flow, are called insulators. In other words, those substances through which electricity cannot flow are called insulators. Glass, ebonite, rubber, most of the plastics, paper, dry wood, cotton, mica, bakelite, and dry air, are all insulators because they do not allow electric charges (or electricity) to flow through them. In the case of charged insulators like glass, ebonite etc., the electric charges remain bound to them and do not move away.

The electrons present in insulators are strongly held by the nuclei of their atoms. Since there are "no free electron" in an insulator which can move from one atom to another, so insulator does not allow electric charges (or electricity) to flow through it.

ELECTRIC CURRENT:

The electric current is a flow of electric charges (called electrons) in a conductor. The magnitude of electric current in a conductor is the amount of electric charge passing through a given point of the conductor in one second. If a charge of **Q** coulombs flow through a conductor in time **t** seconds, then the magnitude of the electric current **I** flowing through it is given by:

$$I = \frac{Q}{t}$$

The nit of charge, in S.I. system is coulomb, which is equivalent to the charge of nearly 6.25×10^{18} electrons.
If charge is measured in coulomb, then the flow of 1 coulomb/second gives us the unit of current, which is called ampere named in the honour French scientist, Andre - Marie Ampere (1775 - 1836).

ELECTRICAL CIRCUITS:

A continuous path consisting of conducting wires and other resistances (like lamps, bulbs etc.) between the terminal of a battery, along which an electric current flows, is called a circuit.