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Topic- Basic Electricity Principles (Part-1)

Basic Electricity Principles

Electricity is an important source of energy in the modern times. Electricity is used in our homes, in industry and in transport. For example, electricity is used in our homes for lighting, operating fans and heating purposes. In Industry, electricity is used to turn various types of machines, and in transport sector electricity is being used to pull electric trains.

Types of Electric charges:-

It has been found by experiments that there are two types of electric charges: positive charges and negative charges. By convention, the charge acquired by a glass rod (rubbed with a silk cloth) is called positive charge and the charge acquired by an ebonite rod (rubbed with a woollen cloth) is called negative charge. An important property of electric charges is that:

(i) Opposite charges: for example; a positive charge attracts a negative charge.

(ii) Similar charges repel each other: for example, a positive charge repels a positive charge and a negative charge repels a negative charge.

The SI unit of electric charge is coulomb.

❑ Electric Potential :-

The electric potential at a point in an electric field is defined as the work done in moving a unit positive charge.

❑ Potential Difference :-

The difference in electric potential between two points is known as potential difference. The potential difference between two points in an electric circuit is defined as the amount of work done in moving a unit charge from one point to the other point. That is:

$$\text{Potential difference} = \frac{\text{Work done}}{\text{Quantity of charge moved}}$$

$$V = \frac{W}{Q}$$

Electric Current

⇒ When two charged bodies at different electric potentials are connected by metal wire, then

electric charges will flow from the body at higher potential to the one at lower potential. This flow of charges in the metal wire constitutes an electric current. It is the potential difference between the ends of the wire which makes the electric charges (or current) to flow in the wire.

The electric current is a flow of electric charges (called electrons) in a conductor such as a metal wire. 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 flows through a conductor in time t seconds, then the magnitude I of the electric current flowing through it is given by

$$\text{Current, } I = \frac{Q}{t}$$

The SI unit of electric current is ampere.