

# 15. Static Electricity

# 16. Current Electricity

Physics fundamentals for revision for  
competitive examinations

# 15. Static Electricity

(1) **Static Electricity** is the stationary charge that is produced by friction. Friction is rubbing of two surfaces against each other. **Charges** get developed **on both the surfaces**, and these charges **are equal in magnitude**, but **opposite in nature**.

(2) Static electricity has **two types of charges** – negative charge carried by electrons, and positive charge carried by proton.

Like charges repel each other and unlike charges attract each other.

(3) **An ion is an atom** which has either gained or lost one or more electrons. The atom that **gains an electron** becomes **a negative ion**, and an atom that has **lost one** or more electrons becomes a **positively charged ion**.

(4) As per **law of conservation of charges**, the charge is **neither created nor destroyed**, but it is transferred from one body to the other.

Charge on a body is  $q = ne$

(5) **Electrostatic Induction** is the process in which an opposite charge is induced on the nearer end and a similar charge is induced on the farther end of an uncharged conductor.

The net result is **a separation of charges**, and **no charge is lost or gained** by the charged body.

## Detecting and Testing of Charges, Sparking and Lightning

- An **electroscope** is a device that detects the presence of charge and identifies the nature of the charge on a charged body.
- **Gold Leaf electroscope** is a special kind of electroscope that can detect very feeble charges. If the body is uncharged, the gold leaves show no movement of divergence, and the body being tested, is said to be neutral. If there is a charge, the leaves diverge. For positive charge the divergence increases, and for negative charge it decreases.
- **Lightning Conductor** is a device that safeguards houses and buildings against damage by lightning during thunder storms. Through it, the high voltage charge in the clouds is transferred into the ground, through a copper strip that links the charged spikes at the roof, to the copper plate in the ground.

# 16. Current Electricity

5. The resistance offered to the flow of current by the filament or wire is called its resistance.

**Resistance of wire (R)** = Potential difference across wire (V) divided by Current flowing in the wire (I) This is Ohm's law.

1. **Current** is the **rate of flow** of charge across a cross section, **normal to the direction of flow** of current. **Direct Current ( D.C.)** is a current of **constant magnitude** flowing in **one direction**.

2. **Current (I)** = **Charge (Q) divided by Time ( t)**. Unit of current is 1 coulomb per second, which is called **ampere**.

3. A simple electric circuit comprises of a bulb, a cell, and a key. Load is the bulb or any appliance connected to the circuit.

4. **Insulators** are materials that resist the flow of current. **Conductors** are materials that allow the flow of current.

## Factors affecting Resistance of a conductor

1. Material
2. length of the wire

If length is same but material is different, resistance will differ

This is because in different materials the concentration of electrons and arrangement of atoms is different.

3. Area of cross section
4. temperature of the wire

Thick wires offer less resistance

Temperature of wire increases, ions in it vibrate more violently. Therefore, resistance of wire increases with increase in temperature.