BISHNUPUR PUBLIC PRIVATE ITI

SUBJECT : **WC&S**

TOPIC : **BASIC ELECTRICITY**

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- **What is proton?**
  The positively charged partial of an atom is called proton.

- **What is Electron ?**
  The smallest partial of atom constraining the smallest Possible quantity of negative charges called an electron.
- In one coulomb the number of electrons are 6.25×10^18.
- The radius of an electron is 10^-13 cm.

- **What is Neutron?**
  It has no charge and it's weight is nearly equal to the mass of a proton.

The Masses And Charges of Electron , Proton & Neutron Are Given Below:

Sl. No.	Partical	Mass(in kg)	Charges in coulombs
1	Electron	9.170×10^-31	- 1.602×10^-19
2	Proton	1.6729×10^-27	+ 1.602×10^-19
3	Neutron	1.6751×10^-27	0

Electrical Terms & Units:

Quantity of electricity

The strength of the current in any conductor is equal to the quantity of electrical charge that flows across any section of it in one second. If 'Q' is the charge and 't' is the time taken.
Then, **I=(Q/T) or, Q=I×T.**

The SI unit of current is **coulomb**. Coulomb is equivalent to the charge contained in nearly **6.24 x 10^ 18** electrons.

Coulomb

In an electric circuit if one Ampere of current passes in one second, then it is called one coulomb. It is also called ampere second (As).

Its larger unit is **ampere hour (AH)**

1AH = 3600 As or 3600 coulomb

Electro motive force (EMF)

It is the force which causes to flow the free electrons in any closed circuit due to difference in electrical pressure or potential. It is represented by 'E.' Its unit is **Volt**.

Potential difference (P.D)

This is the difference in electrical potential measured across two points of the circuit. Potential difference is always less than EMF. The supply voltage is called potential difference. It is represented by V.

Voltage

It is the electric potential between two lines or phase and neutral. Its unit is **volt**. Voltmeter is used to measure voltage and it is connected parallel between the supply terminals.

Volt

It is defined as when a current of 1 ampere flows through a resistance of 1 ohm, it is said to have potential difference of 1 volt.

Current

It is the flow of electrons in any conductor is called current. It is represented by I and its unit is **Ampere**.

Ammeter is used to measure the current by connecting series with the circuit.

Ampere

When **6.24 x 10^18** electrons flow in one second across any cross section of any conductor, the current in it is one ampere.

(**or**) If the potential difference across the two ends of a conductor is 1 volt and the resistance of conductor is 1 ohm then the current through is 1 ampere.

Resistance

It is the property of a substance to oppose to the flow of electric current through it, is called resistance. Symbol: R,

Unit : **Ohm** , **Ohm meter** is used to measure the resistance.

Ohm

If the potential difference across the two ends of conductor is 1 volt and the current through it is 1 ampere, then the resistance of the conductor is 1 Ohm.

Laws of resistance

The resistance offered by conductor depends on the following factors.

The resistance of the conductor

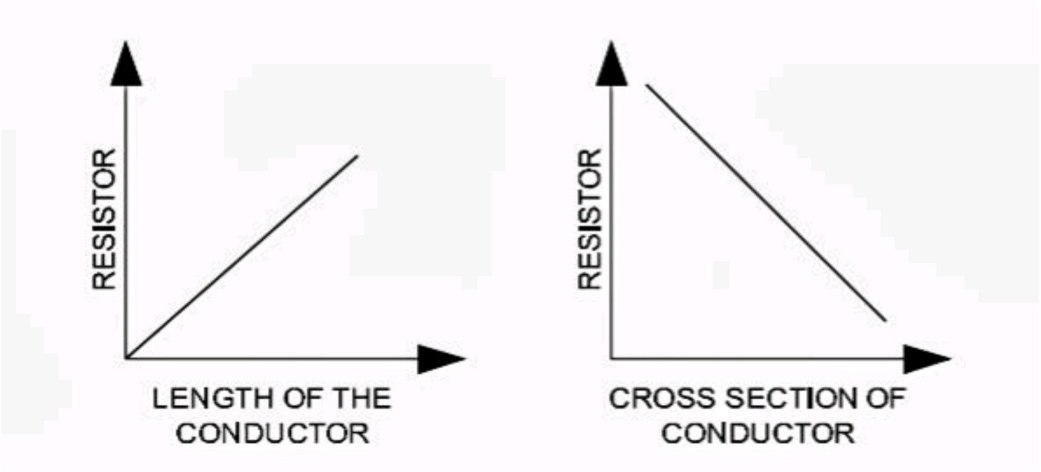
1) is directly proportional to the length of the conductor

$$(R \alpha L)$$

2) Varies inversely proportional to its cross sectional area of the conductor

$$\left(R \alpha \frac{1}{A}\right)$$

3) Depends on the material with which it is made.



4) depends on the temperature of the conductor

$$R \propto L \; ; \; R \propto \frac{1}{A}; \quad R \propto \frac{L}{A}; \; R = \rho \frac{L}{A}$$

Specific resistance

The specific resistance of a material is the resistance offered to a current it passed between the opposite faces of the unit cube of the material.

Specific resistance is measured in Ohm - m or micro ohm - cm. Each material has its own specific resistance or resistivity.

E.g. : Copper - 1.72 μΩ cm, Silver - 1.64 μΩ cm, Eureka - 38.5 μΩ cm, Iron - 9.8 μΩ cm, Aluminium - 2.8 μΩ cm, Nickel - 7.8 μΩ cm.

$$R = \frac{\rho l}{A} \text{ ohm cm}$$

R = Resistance in ohms

l = Length of the conductor in cm

r = Specific Resistance in ohm cm (symbol pronounced as rho)

A = Area of cross - section in cm^2