



BISHNUPUR PUBLIC PRIVATE ITI

SUBJECT : WC&S

TOPIC : BASIC ELECTRICITY

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Conductor:

The substance which offers low resistance in the flow of electrical current or the substances in which electrical current can flow easily such substance are called conductors.

E.g. silver, copper , aluminum, brass, zinc, iron , lead, tin etc.

Properties of conductors:

A good conductor should have the following properties.

Electrical properties

- The conductivity must be good.
- Electrical energy spent in the form of heat must be low.
- Resistivity must be low (to reduce voltage drop and loss).
- Increase in resistance with temperature must be low.

Mechanical properties

- Ductility (the property of being drawn into thin wires).
- Solderability: the joint should have minimum contact resistance.
- Resistance to corrosion: should not get rusted when used outdoors.
- Should withstand stress and strain. • It should be easy to fabricate.

Economical factors

- Low cost.
- Easy availability.
- Easy to manufacture.

Classification of conductors

Conductors

(1)Metallic (2) Electrolytic (3) Gaseous

Silver

It is a soft and extremely malleable metal. Even though it is the best conductor, its use is limited because of its high cost.

Copper

It is a very good conductor. It is malleable and ductile, and also has high resistance to corrosion by liquids. Therefore, it is widely used for wires, cables, overhead conductors, busbars and conducting parts of various electrical appliance.

Aluminium

It is a metal light in weight. It is also ductile, malleable and a good conductor of electricity. Nowadays, it is more widely used (since it is cheaper than copper) for wires and cables.

RESISTANCE WIRES

These are conductors with very high resistance for specific applications like filaments of incandescent lamps, heating elements etc. The following are a few examples:

1)Tungsten, 2) Nichrome, 3) Eureka,4) German silver, 5)Manganin, 6)Platinum,7) Mercury ,8) Carbon ,9) sBrass.

The resistance values of the metallic resistances will increase with increase in temperature.

Insulators:

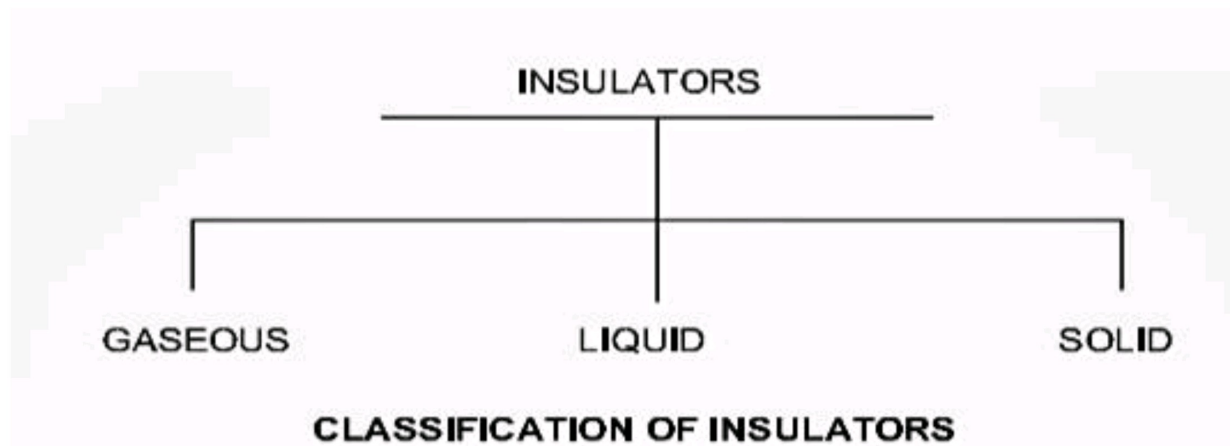
These are the materials which offer very high resistance to the flow of current and make current flow very negligible or nil.

Properties of insulators

The main requirements of a good insulating material are:

- high specific resistance (many megohms/cm cube) to reduce the leakage currents to a negligible value
- good dielectric strength i.e. high value of breakdown voltage (expressed in kilovolts per mm)
- good mechanical strength, in tension or compression.
- little deterioration with rise in temperature .
- non-absorption of moisture, when exposed to damp atmospheric condition.

Classification of insulators



- Air is an example of a gaseous insulator. Other examples are hydrogen, nitrogen and inert gases.
- Liquid insulators: Mineral oils, synthetic liquids, resins and varnishes are the liquid insulators.

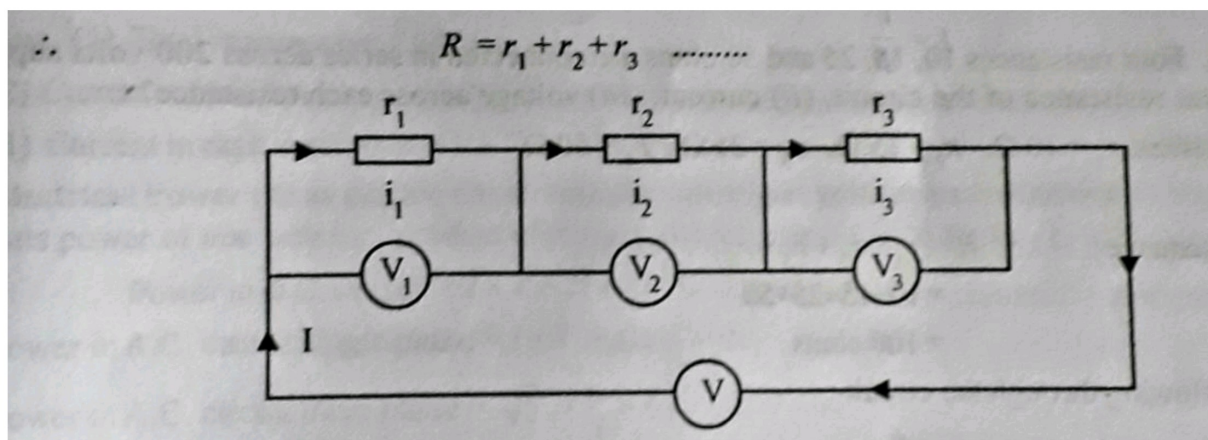
- Solid insulators/insulating materials:

Sl. No.	Classification	Examples
1	Mineral insulators	Mica, marble, slate.
2	Vitreous materials	Glass, quartz, procelain.
3	Rubber and rubber products	Rubber, vulcanised (India) rubber (V.I.R) ebonite
4	Waxes and compounds	Paraffin wax, bitumen.
5	Fibrous materials	Asbestos, paper, wood, Press pahn, leatheroid, cotton, silk, tapes etc.
6	Synthetic products	Bakelite, shellac, oil (for Transformer, Switchgear etc).

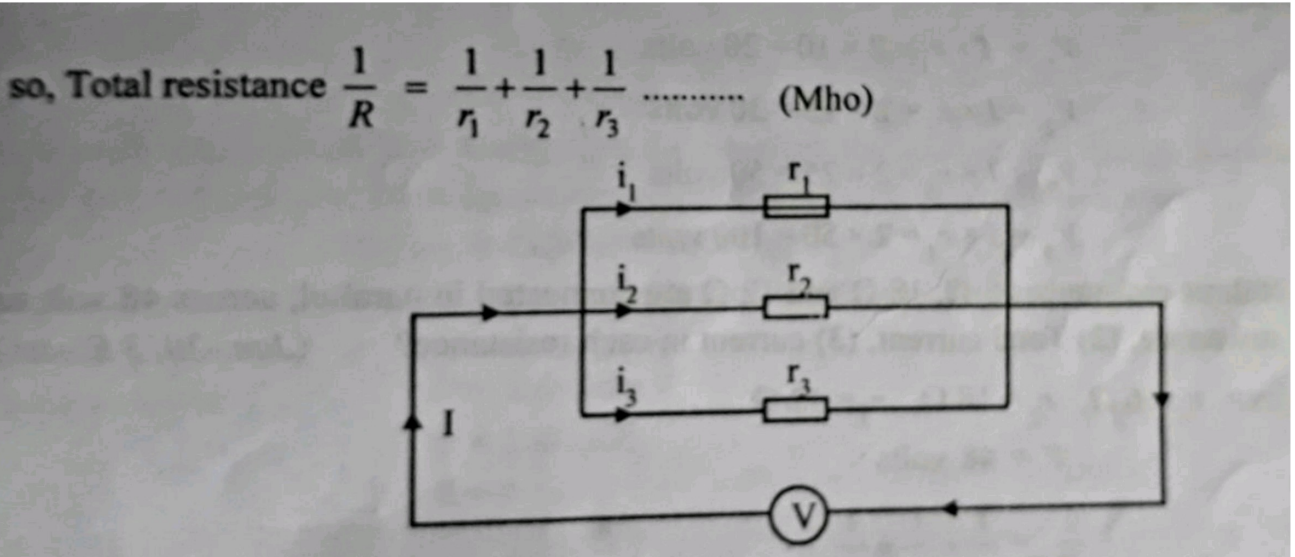
Connections Of Resistance:

- Series Connection
- Parallel Connection.
- Combination or Mixed or Series parallel connection.

Series Connection: If two or more resistances are connected in such a way that there is only one path for the current to flow ,it is known as the series connection.



Parallel Connection: When two or more than two resistances are connected in such a way that all the Starting ends are connected to one terminal & all the ending ends are connected together at another terminal & these two points are taken for supply.



Combination or Mixed or Series parallel connection:

When three or more than three resistances are joined in such a way that the circuit has the characteristics of both the series as well as the parallel.

