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## **CONDUCTORS & NON-CONDUCTORS**

### **What are Conductors?**

- The materials or substances that allow electricity to flow through them are conductors. Also, conductors allow heat to be transmitted through them. The examples of conductors are metals, the human body, Earth and animals.
- The human body is a strong conductor. It, therefore, offers a resistance-free route from a current-carrying wire through the body for the current to flow.
- Conductors have free electrons on their surface that allow the easy passage of current. This is the reason that electricity transmits freely through the conductors.

### **Applications of Conductors**

In certain aspects, conductors are very useful. They have many real-life applications. For example,

- To check the temperature of a body, mercury is a common material in the thermometer.
- Aluminium finds use in the manufacture of foils for food preservation. It is also used in cooking vessels as it is a good conductor of electricity and heat.
- Iron is a common material used to conduct heat in vehicle engine manufacturing. The iron plate is composed of steel to briskly absorb heat.
- In car radiators, conductors find their use in the eradication of heat away from the engine.

### **Insulators**

- The materials or substances that resist or don't allow the current to pass through them are insulators. They are, in general, solid in nature.
- Often, in a number of systems, insulators are used as they do not allow heat to flow. The resistivity is the property which makes insulators different from conductors.
- Some good examples of insulators are wood, fabric, glass, mica, and quartz.
- Insulators provide protection against fire, sound, and, of course, electricity transmission.
- In addition, insulators have no free electrons at all. This is the predominant explanation of why they don't conduct electricity.

### **Examples of Insulators**

- As it has the highest resistivity, glass is the strongest insulator.
- Plastic is a good insulator and is used to manufacture a variety of products.
- A common material used in the manufacture of tyres, fire-resistant clothing, and slippers is rubber. This is because it is an insulator.

### **Difference Between Conductors and Insulators**

| Conductors   | Insulators   |
|--|--|
| A conductor allows current to flow easily through it.                  | An Insulator doesn't allow current to flow through it.                     |
| Electric charge exists on the surface of conductors.                   | Electric charges are absent in insulators.                                 |
| Conductors don't store energy when kept in a magnetic field.           | Insulators store energy when kept in a magnetic field.                     |
| The thermal conductivity (heat allowance) of a conductor is very high. | The thermal conductivity of an insulator is very low.                      |
| The resistance of a conductor is very low.                             | The resistance of insulator is very high.                                  |
| Copper, Aluminium, and Mercury are some conductors.                    | Wood, paper, and ceramic are some insulators.                              |
| Conductors are used in making electrical equipment.                    | Insulators are used in insulating electrical equipment for safety purpose. |

## What is an Electrical Conductor?

- If you have to give the simplest definition of electrical conductors, they are materials that allow electricity to flow easily through them.
- If we compare two kinds of materials and the first one allows electricity to pass through it more readily, then that material is said to be a strong conductor of electricity.
- Some examples of conductors of electricity are:
  - Copper
  - Aluminium
  - Silver
  - Gold
  - Graphite
  - Platinum
  - Water
  - People
- An electric conductor enables electrical charges to pass through them easily. The property of conductors is called conductivity to "conduct" electricity. Such materials offer less opposition to the movement of charges, or "resistance." Due to the free movement of electrons through them, conducting materials allow easy charge transfer.

## Properties of Electrical Conductor

In equilibrium conditions, a conductor exhibits the following properties:

- The movement of electrons and ions in them is permitted by a conductor.
- A conductor's electrical field is zero, allowing electrons to pass inside it.
- A conductor's charge density is zero.
- Free charges occur only on the surface of the conductor.
- Both of a conductor's ends are at the same potential.

Many metals are strong conductors of electricity. Insulators are known as the plastic coating that covers an electrical conductor. This prevents us from an electric shock.

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