

## **DON BOSCO HIGH SCHOOL PANJIM**

### **LESSON 3 ELECTRICITY CIRCUITS AND ITS COMPONENTS**

#### **1. What is electricity?**

**Answer:**

Electricity is a form of energy that enables us to operate electrical devices such as lights, fans, televisions, computers, and refrigerators. It flows through a closed path called an **electric circuit**.

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#### **2. What is an electric circuit?**

**Answer:**

An electric circuit is a complete and closed path through which electric current flows from the positive terminal of a cell, through the electrical components, and back to the negative terminal. If the circuit is broken, the current cannot flow.

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#### **3. Name the main components of a simple electric circuit.**

**Answer:**

A simple electric circuit consists of:

- An electric cell or battery (source of electricity)
- Connecting wires
- A switch
- A bulb or LED (electrical load)

Each component plays an important role in allowing electricity to flow.

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#### **4. What is an electric cell? Name its two terminals.**

**Answer:**

An electric cell is a source of electrical energy. It converts chemical energy into electrical energy.

It has two terminals:

- **Positive terminal (+)**
- **Negative terminal (–)**

Electric current flows through the circuit from the positive terminal to the negative terminal.

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## 5. What is the difference between an electric cell and a battery?

**Answer:**

| <b>Electric Cell</b>                      | <b>Battery</b>                                |
|-------------------------------------------|-----------------------------------------------|
| A single source of electrical energy.     | Two or more cells joined together.            |
| Produces a smaller amount of electricity. | Produces more electricity than a single cell. |

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## 6. What is the function of connecting wires in an electric circuit?

**Answer:**

Connecting wires join all the components of the circuit and provide a path for electric current to flow. They are usually made of **copper** because copper is an excellent conductor of electricity.

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## 7. What is a switch? Why is it used?

**Answer:**

A switch is a device used to **open or close an electric circuit**.

- When the switch is **ON (closed)**, electric current flows.
  - When the switch is **OFF (open)**, the circuit is broken and the current stops flowing.
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## 8. What is an electric bulb? How does it produce light?

**Answer:**

An electric bulb is a device that produces light. Inside the bulb is a very thin wire called the **filament**. When electric current passes through the filament, it becomes very hot and glows, producing light.

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### 9. What is a filament?

#### Answer:

A filament is a very thin wire inside an electric bulb, usually made of **tungsten**. It glows because it becomes extremely hot when electric current passes through it.

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### 10. What is an LED? Mention two advantages of using an LED.

#### Answer:

**LED** stands for **Light Emitting Diode**. It is an electronic device that gives out light when electric current passes through it.

#### Advantages of LEDs:

- They use **less electricity** than ordinary bulbs.
  - They produce **very little heat** and last much longer.
  - They are brighter and more energy-efficient.
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### 11. What is the difference between an electric bulb and an LED?

#### Answer:

| Electric Bulb          | LED                        |
|------------------------|----------------------------|
| Has a filament.        | Has no filament.           |
| Uses more electricity. | Uses less electricity.     |
| Produces more heat.    | Produces very little heat. |
| Has a shorter life.    | Lasts much longer.         |

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### 12. What is the difference between an open circuit and a closed circuit?

#### Answer:

| <b>Open Circuit</b>        | <b>Closed Circuit</b> |
|----------------------------|-----------------------|
| Circuit is incomplete.     | Circuit is complete.  |
| Current cannot flow.       | Current flows.        |
| Bulb or LED does not glow. | Bulb or LED glows.    |

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### **13. Why does a bulb or LED not glow in an open circuit?**

**Answer:**

In an open circuit, the path for electric current is broken. Since current cannot flow through the bulb or LED, it does not glow.

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### **14. What is electric current?**

**Answer:**

Electric current is the flow of electric charges through a conductor in a closed circuit.

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### **15. What is a conductor? Give four examples.**

**Answer:**

A conductor is a material that allows electric current to pass through it easily.

**Examples:**

- Copper
  - Aluminium
  - Iron
  - Silver
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### **16. What is an insulator? Give four examples.**

**Answer:**

An insulator is a material that does not allow electric current to pass through it easily.

**Examples:**

- Plastic
  - Rubber
  - Glass
  - Wood
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**17. Why are electric wires covered with plastic or rubber?**

**Answer:**

Plastic and rubber are **insulators**. They prevent electric current from passing through the outer covering of the wire, protecting people from electric shocks.

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**18. Why is copper commonly used for making electric wires?**

**Answer:**

Copper is widely used because it is:

- A very good conductor of electricity.
  - Strong and durable.
  - Flexible and easy to bend into wires.
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**19. Explain how a simple electric circuit works.**

**Answer:**

When the switch is closed, the circuit becomes complete. Electric current flows from the positive terminal of the cell through the wires, switch, and bulb (or LED), and returns to the negative terminal. As current passes through the bulb or LED, it produces light.

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**20. What happens if one wire becomes loose or disconnected?**

**Answer:**

The circuit becomes incomplete or open. Since electric current cannot flow through the broken path, the bulb or LED will not glow.

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**21. State four safety precautions while using electricity.**

**Answer:**

- Never touch electrical appliances with wet hands.
  - Never insert metal objects into electric sockets.
  - Do not use damaged or broken wires.
  - Switch off the power supply before repairing electrical appliances.
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**22. Differentiate between conductors and insulators.**

| Conductors                                   | Insulators                                    |
|----------------------------------------------|-----------------------------------------------|
| Allow electric current to pass through them. | Do not allow electric current to pass easily. |
| Used for making wires.                       | Used for covering wires.                      |
| Examples: Copper, Aluminium                  | Examples: Plastic, Rubber                     |

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**23. Why do electricians wear rubber gloves while working?****Answer:**

Rubber is an insulator. It does not allow electric current to pass through it. Wearing rubber gloves protects electricians from electric shocks while working with electrical wires.

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**24. Complete the table.**

| Component | Function                                           |
|-----------|----------------------------------------------------|
| Cell      | Supplies electrical energy                         |
| Battery   | Supplies electrical energy using two or more cells |
| Wire      | Carries electric current                           |
| Switch    | Opens or closes the circuit                        |
| Bulb      | Produces light using a filament                    |
| LED       | Produces light using very little electricity       |

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**25. Draw and explain a simple electric circuit.**

**Answer:**

(+) Cell — Switch — Bulb/LED — (-) Cell  
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**Explanation:**

- The **cell** provides electrical energy.
- The **wires** connect all the components.
- The **switch** controls the flow of electricity.
- The **bulb or LED** glows when the switch is closed because the circuit is complete.

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### Higher-Order Thinking Questions

**1. Why does the bulb stop glowing if the filament breaks?**

**Answer:**

A broken filament breaks the circuit inside the bulb. Since electric current cannot pass through it, the bulb does not glow.

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**2. Why is a battery used instead of a single cell in some devices?**

**Answer:**

Some electrical devices need more electrical energy than a single cell can provide. A battery, made by joining two or more cells, supplies a greater amount of electrical energy.

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**3. A bulb or LED does not glow even though the switch is ON. Give three possible reasons.**

**Answer:**

- The cell or battery is discharged.
- The bulb's filament is broken or the LED is faulty.

- A wire is loose or disconnected, making the circuit incomplete.
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#### **4. Why are metals used for making wires while plastics are used for covering them?**

**Answer:**

Metals like copper are good conductors and allow electricity to flow easily. Plastics are insulators, so they prevent electric shocks by stopping electricity from passing through the outer covering.

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#### **5. Why are LED lights replacing ordinary bulbs in many homes?**

**Answer:**

LED lights are replacing ordinary bulbs because they:

- Use much less electricity.
  - Last much longer.
  - Produce very little heat.
  - Help save energy and reduce electricity bills.
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#### **Quick Revision**

| <b>Term</b> | <b>Meaning</b>                                                       |
|-------------|----------------------------------------------------------------------|
| Electricity | A form of energy that powers electrical devices.                     |
| Circuit     | A complete path through which electric current flows.                |
| Cell        | A source of electrical energy.                                       |
| Battery     | Two or more cells joined together.                                   |
| Switch      | Opens or closes a circuit.                                           |
| Bulb        | Produces light using a glowing filament.                             |
| LED         | Light Emitting Diode; produces light efficiently without a filament. |
| Conductor   | Material that allows electricity to pass through it.                 |
| Insulator   | Material that does not allow electricity to pass through it.         |

Open Circuit    Broken path; current cannot flow.

Closed  
Circuit        Complete path; current flows.