

NOTES

CLASS 6

SCIENCE

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ELECTRICITY AND CIRCUITS

Definition of Electricity:

Electricity is the flow of electrical power or the charges (electrons) through a proper medium commonly the wires we see in our homes.

Electric Circuit:

Electric circuit is a closed path that provides a continuous flow of electrons or electric current from a voltage or current source to the equipment being used. This path of current flow or a circuit can be represented using various symbols and notation for different components and is called a circuit diagram.

Open and Closed Circuits:

The path travelled by the electric current from one terminal to its other terminal when it is unbroken and continuous then it is called a closed circuit and if the same path is broken somewhere along the path that stops current to flow continuously is called an open circuit.

Electrical Components:

1. Wires: These are the electrical conductors used to connect two or more electrical components and allow the flow of current. The wires are generally made of metals that are good conductors of electricity and based on the usage, the type of metal and the dimension of wire is selected.

2. Bulb: It is a glass case composed of a filament inside it connected to the two terminals and which gets heated up upon the passage of electric current and emits light. The filament wire is generally made up of coiled tungsten wire. The electricity is supplied through the two terminals between which the filament is present.

3. Electric Cell or Dry Cell: It is a kind of device that stores chemical energy and converts it into electrical energy that can be used for different purposes. It has two terminals namely positive and negative. Inside a cell, the charges flow from the negative terminal to positive terminal while the reverse happens outside the cell.

4. Battery: This is made up of a combination of two or more cells combined in a series configuration.

5. Switch: It is a simple device used in an electrical circuit to allow or restrict the continuous flow of current. It is placed between a gap in a circuit and when turned on, it fills the gap with a conducting medium making the circuit work and when off breaks the circuit by removing the conducting medium from the gap.

The above components together can be seen in an electric torch that consists of connecting wires, battery and an LED (Light Emitting Diode) bulb.

Electrical Conductors and Insulators:

Electrical conductors are the materials that allow the flow of electricity through it. All the metals come under the category of good conductors of electricity. Among non-metals only carbon can conduct electricity which can be experimented by connecting wires across the two ends of a pencil.



On the contrary, the materials that do not allow electric currents to flow through it are called the bad conductors or the insulators. Some examples of insulators are plastic, rubber, dry wood, PVC etc.

Effects of Electricity:

The flow of electric current through a material is accompanied with some other effects which sometimes are used for other purposes or causes energy losses. Some of the effects are as follows;

- **Heating Effect:** This effect is used in electric heaters, ovens, etc.
- **Lighting Effect:** The primary example is an electric bulb.
- **Magnetic Effect:** Used in electromagnets.

SOME IMPORTANT QUESTIONS

1. What is the direction of flow of current in a dry cell?

Ans: . The current flows in closed circuit from +ve to -ve terminal of cell.

2. Name the +ve terminal of dry cell.

Ans:. Carbon rod with a metal cap on it.

3. Name the -ve terminal of a dry cell.

Ans: Zinc metal plate.

4. What is dry cell?

Ans: It is a device which converts chemical energy into electrical energy.

5. What is solar cell?

Ans: A device which converts solar energy into electrical energy.

6. What is open circuit?

Ans: An electric circuit in which electrical contact at any point is broken is called open circuit.

7. Write one use of insulators.

Ans: Insulators are used in making switchboard, handles of testers, screw drivers.

8. What is the name of thin wire in the electric bulb?

Ans: Filament.



SOME OTHER IMPORTANT QUESTIONS

Question 1: Fill in the blanks :

(a) An electric cell has _____ terminals.

(b) A device that is used to break an electric circuit is called _____.

Answer 1:

(a) two terminals. **(b)** a switch.

Question 2: Choose the incorrect statement.

(a) A switch is the source of electric current in a circuit.

(b) A switch helps us to use electricity as per our requirement.

(c) A switch helps to complete or break the circuit.

(d) When the switch is open, an air gap between its terminals is present.

Answer 2: (a) A switch is the source of electric current in a circuit.

Batteries are the source of electric current in a circuit. Batteries create a difference in electric potential due to which current flows.

Question 3: Determine 'True' or 'False' for the following statements:

- (a) Electricity can flow through metals.
- (b) Electric current can pass through a sheet of thermocol. .
- (c) Instead of metal wires, a jute string can be used to make a circuit.

Answer 3:

(a) True

Metals have a conductivity property which allows the electric current to pass through them.

(b) False

it does not have the property of electric conductivity

(c) False

A jute does not allow electricity or electric current to pass through it.

Question 4: Which of the following is performed by an electric cell

1. a) Uses electricity
2. b) Uses light
3. c) Produces electricity
4. d) None of the above

Answer 4: c) Produces electricity

An electric circuit produces electricity and acts as a source of electricity in an electric circuit.

Question 5: What is the purpose of using an electric switch? Name some of the electrical gadgets that have switches built into them.

Answer 5: The function of a key in an electric circuit is to complete the circuit or break the circuit. All the electric gadgets have switches built into them like television, oven, fan etc.

Question 6: The filament of a torch bulb is

- (a) A metal case.
- (b) Two thick wires.
- (c) Metal tip at the centre of the base.
- (d) A thin wire.

Answer 6: (d) a thin wire. The filament of the bulb is made of a thin wire from a metal called tungsten, as it has a very high melting point.

Question 7: Define

1. i) Electric cell
2. ii) Battery

Answer 7:

1. i) Electric cell is the source of energy in an electric circuit. It produces electricity through chemical reactions present inside the cell.
2. ii) Battery is formed when two or more cells are joined together in a circuit.

Question 8: Why should an electrician use rubber gloves while repairing an electric switch at your home? Explain.

Answer 8: An electrician uses rubber gloves while repairing an electric switch at your home as rubber is an insulator and hence will not allow electricity to pass through it. Hence using rubber gloves protects the electrician from electric shock.

Question 9: What are the reasons why the bulb in an electric circuit does not light up?

Answer 9: Given below are some of the reasons why a bulb does not light up in an electric circuit:

1. Only one of the wires is connected properly to the electric cell, while the other is poorly connected or not connected at all.
2. Two different wires are not connected or soldered properly.



3. One wire is connected properly to the bulb, while the other is not connected or is poorly connected.

Question 10: What is an electric circuit?

Answer 10: Electric circuit consists of a wire, battery, switch, and appliance. An electric circuit is defined as a closed path through which electricity passes. through the positive terminal of the battery to the negative terminal. The switch is used to break or start the flow of electricity in a circuit made from a conductive substance.

Question 11: How does the bulb function, and what causes the bulb to fuse?

Answer 11: A bulb is an electric appliance which emits light by converting electric energy into light energy.

A bulb consists of a thin wire-like structure known as a filament. When the circuit is switched on, electricity passes through the electric current. This causes the filament present in the bulb to heat up, and the bulb is lit up.

The filament is usually made by substances having high melting points, as when electricity passes the filament, it lights up and gets heated. But sometimes, when there is a surge of electricity in the circuit, more amount of electricity passes through the filament causing the filament to heat up more hence increasing its temperature. This causes the filament to melt due to excessive heat. This results in the fusing of the bulb.

Question 12: Paheli wanted to glow a torch bulb using a cell. She could not get connecting wires; instead, she got two strips of aluminium foil. Will she succeed? Explain how?

Answer 12: Paheli will succeed in glowing a torch bulb using aluminium foil as aluminium is a metal; hence it conducts electricity. By attaching one strip of aluminium to the positive terminal of the bulb and the other to the negative terminal of the bulb, the circuit will be completed, and electricity will pass through, resulting in the torch bulb glowing.

Question 13: choose the correct option

(i) Cell is a device which

- (a) converts chemical energy in electrical energy**
- (b) electrical energy into magnetic energy**
- (c) electrical energy into light energy**
- (d) None of the above**

Answer: a) converts chemical energy in electrical energy

In a cell, various chemicals are used to produce a potential difference.

(ii) A bulb has

- (a) two terminals and one filament**
- (b) two terminals and two filaments**
- (c) multiple terminals and single filament**
- (d) single terminal and single filament**

Answer:

(a) two terminals and one filament

A bulb has a filament which glows and two terminals which are joined by two terminals of the battery.

(iii) Filament present inside the bulb is made up of

- (a) aluminium**
- (b) chromium**
- (c) platinum**
- (d) tungsten**

Answer:

(d) Tungsten

As tungsten metal has a very high melting point and high resistance.



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