## **NCERT Solution**

## **Electric Current and Its Effects**

## Exercise

1. Draw in your notebook the symbols to represent the following components of electrical circuits: connecting wires, switch in the 'OFF' position, bulb, cell, switch in the 'ON' position, and battery.

Answer:

Component of electrical circuit	Symbol
Connecting wires	
Switch in the `OFF' position	
Bulb	P
Cell	T
Switch in the `ON' position	
Battery	— ННН—

2. Draw the circuit diagram to represent the circuit shown in Fig. 14.21.



Answer:



A Battery Bulb Light Circuit in Switch Off Position



3. Fig.14.22 shows four cells fixed on a board. Draw lines to indicate how you will connect their terminals with wires to make a battery of four cells.



Answer:

To make a battery, negative terminal of one cell must be connect to the positive terminal of next cell.





4. The bulb in the circuit shown in Fig.14.23 does not glow. Can you identify the problem? Make necessary changes in the circuit to make the bulb glow.



Answer:

In the circuit positive terminal of the cell is connected with positive terminal of the other cell which is not a correct connection. To make the bulb glow, the positive terminal of one cell should be connected with negative terminal of other cell and two terminals of lamp should be connected to outer positive and negative terminal of two cells through wire and a switch in 'ON' position as shown in the given below diagram



5. Name any two effects of electric current.

Answer :



1. Heating Effect: When an electric current flows through a wire, the wire gets heated. It is the heating effect of current. This effect has many applications like Electric Heater, Light Bulb etc.

2. Magnetic effect: When an electric current flows through a wire, it produces magnetic effect around it. A current carrying coil of an insulated wire wrapped around a piece of iron is called an electromagnet. Magnetic Effect of electric current has many applications like Electric Bell, Motor, Fan etc

6. When the current is switched on through a wire, a compass needle kept nearby gets deflected from its north-south position. Explain.

Answer:

We know that the needle of a compass is a tiny magnet, which points in north-south direction. When we bring a magnet close to it, the needle gets deflected. Also, when an electric current flows through a wire, it produces magnetic effect around it. Therefore, when the current is switched on through a wire, a compass needle kept nearby gets deflected from its north-south position due to magnetic effect of electric current around the wire.

7. Will the compass needle show deflection when the switch in the circuit shown by Fig.14.24 is closed?



Answer:

The compass needle will not show any deflection when the switch in the circuit shown by above figure is closed, because there is no power source like cells in the



circuit hence there will be no electric current flow in the circuit. In the absence of electric current there will be no magnetic effect to cause the deflection of compass needle.

8. Fill in the blanks:

(a) Longer line in the symbol for a cell represents its \_\_\_\_\_\_terminal.

(b) The combination of two or more cells is called a \_\_\_\_\_\_

(c) When current is switched 'on' in a room heater, it \_\_\_\_\_

(d) The safety device based on the heating effect of electric current is called

а\_\_\_\_\_

Answer:

(a) Longer line in the symbol for a cell represents its negative terminal.

(b) The combination of two or more cells is called a battery.

(c) When current is switched 'on' in a room heater, it becomes red hot and gives out heat.

(d) The safety device based on the heating effect of electric current is called a fuse.

9. Mark 'T' if the statement is true and 'F' if it is false:

(a) To make a battery of two cells, the negative terminal of one cell is connected to the negative terminal of the other cell.

(b) When the electric current through the fuse exceeds a certain limit, the fuse wire melts and breaks.

(c) An electromagnet does not attract a piece of iron.

(d) An electric bell has an electromagnet.

Answer:

(a) To make a battery of two cells, the negative terminal of one cell is connected to the negative terminal of the other cell. (F)

(b) When the electric current through the fuse exceeds a certain limit, the fuse wire melts and breaks. (T)

(c) An electromagnet does not attract a piece of iron. (F)

(d) An electric bell has an electromagnet.



(T)

10. Do you think an electromagnet can be used for separating plastic bags from a garbage heap? Explain.

## Answer:

An electromagnet cannot be used for separating plastic bags from a garbage heap as it attracts only iron pieces and will not attract plastic bags.

11. An electrician is carrying out some repairs in your house. He wants to replace a fuse by a piece of wire. Would you agree? Give reasons for your response.

Answer:

There is a maximum limit on the current which can safely flow through a circuit. If by accident the current exceeds this safe limit, the wires may become overheated and may cause fire. To prevent this, in all buildings fuses are inserted in all electrical circuits. If a proper fuse is there in the circuit, it will blow off and break the circuit. A fuse is thus a safety device which prevents damages to electrical circuits and possible fires. So we will not agree with an electrician, who is using a wire in place of fuse of proper rating as if by accident the current exceeds safe limit, the wires may become overheated and may cause fire.

12. Zubeda made an electric circuit using a cell holder shown in Fig. 14.4, a switch and a bulb. When she put the switch in the 'ON' position, the bulb did not glow. Help Zubeda in identifying the possible defects in the circuit.



Solution :



Possible defects in the circuit may be as follows:

1. The cells may not be placed correctly in the cell holder i.e. negative terminal facing negative or positive terminal facing positive terminal of the other cell.

- 2. Bulb may be fuse with broken filament.
- 3. Switch may be faulty

The cells, switch, and bulb should be arranged as shown in the figure.



13. In the circuit shown in Fig. 14.25



(i) Would any of the bulb glow when the switch is in the 'OFF' position?(ii) What will be the order in which the bulbs A, B and C will glow when the switch is moved to the 'ON' position?

Answer :



(i) None of the bulb will glow when the switch is in the 'OFF' position as there will be no electric current in the circuit.

(ii) The Bulb A, B and C will glow when they are connected as shown in the figure given below and the switch is moved to 'ON' position.



