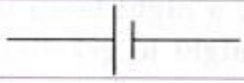
CHAPTER: 14
ELECTRIC CURRENT AND ITS EFFECTS

SOLUTIONS:

EXERCISES

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

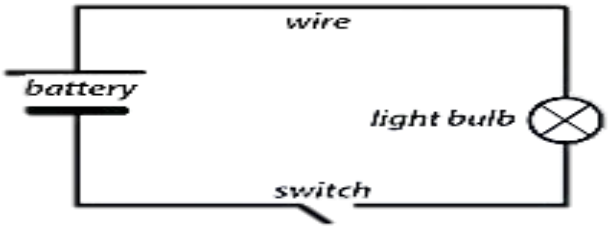
Ans:

Component of electric circuit	Symbol
Connecting wires	
Switch in the 'OFF' position	
Bulb	
Cell	
Switch in the 'ON' position	
Battery	

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

Fig. 14.21

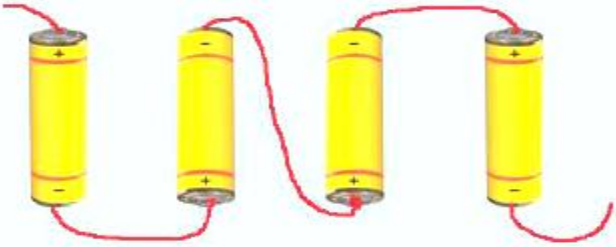
Ans:-



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.

Fig. 14.22

Ans:-



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.

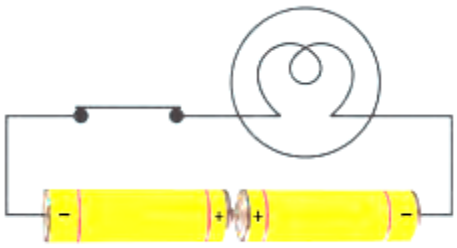
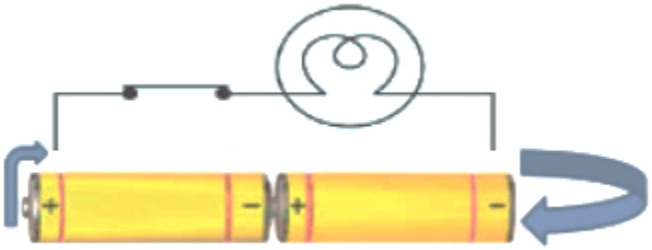


Fig. 14.23

Ans:- In the above circuit,the positive terminals of the two cells are connected. Because of this the bulb does not glow. The necessary changes in the circuit is given in the below figure



5. Name any two effects of electric current.

Ans:- i) Heating effect of electric current

ii) Magnetic effect of electric current

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

Ans:- When the current is switched on through a wire, a magnetic field is produced around the wire. Since a compass needle is a small magnet, it gets deflection due to the magnetic field.

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

Fig. 14.24

Ans:- No , the compass needle will not show any deflection when the switch in the circuit is closed because there is no cell connected to the wire. Until there is current, magnetic field will not be produced.

8. Fill in the blanks:

(a) Longer line in the symbol for a cell represents its **positive** terminal.
(b) The combination of two or more cells is called a **battery.**
(c) When current is switched 'on' in a room heater, it **produces 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. (T/F)

Ans:- F

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

Ans:- T

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

Ans:- F

(d) An electric bell has an electromagnet. (T/F)

Ans:- T

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

Ans:- No, an electromagnet cannot be used for separating plastic bags from a garbage heap because plastic does not have magnetic properties. Therefore, an electromagnet cannot attract it.

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.

Ans:- No, I would not agree to replace a fuse with a piece of wire because a wire is a metal which has high melting point and it would not melt when there is overload in the circuit. Due to this, there may be short circuits and fire may broke out.

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.

Fig. 14.4 A cell holder

Ans:- The possible defects in the circuit are :-

i) The wire connection may be loose.
ii) The switch button may not be working.
iii) The cells may be dried up.

13. In the circuit shown in Fig. 14.25

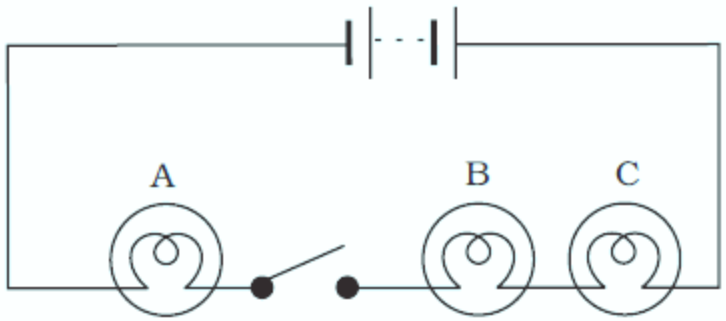


Fig. 14.25

i) Would any of the bulbs glow when the switch is in the 'OFF' position?

Ans:- No, because the circuit is not complete.

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?

Ans:- If the switch is moved to the 'ON' position all the bulbs will glow simultaneously.

EXTRA QUESTIONS AND ANSWERS

1. How can we represent electric components of a circuit in an easier way while drawing?

Ans:- We can represent electric components of a circuit in an easier way by using symbols.

2. How can you connect cells that are kept side by side?

Ans:- We can connect cells that are kept side by side with the help of a cell holder.

3. When do we say that a circuit is closed?

Ans:- We say that a circuit is closed when the switch is in 'ON' position.

4. When do we say that a circuit is opened?

Ans:- We say that a circuit is opened when the switch is in 'OFF' position.

5. What is a filament?

Ans:- The thin wire which glows in an electric bulb when current passes through it, is called a filament.

6. When does a bulb get fused?

Ans:- A bulb gets fused when its filament is broken.

7. What is heating element effect of electric current?

Ans:- When electric current is passed through a wire for a longer period of time, the wire gets hot. This is known as heating effects of the electric current.

8. Name some electrical appliances where heating effect of current is used?

Ans:- Immersion rod, heater, hotplate, iron, geyser, electric kettles etc.

9. What are the factors on which the amount of heat produced in a wire depend?

Ans:- The factors on which the amount of heat produced in a wire depend on are:-

i) Material of the wire
ii) Length of the wire
iii) Thickness of the wire.

10. Why is incandescent electric bulb not desirable to use?

Ans:- Incandescent electric bulb gives out heat and light. Since a part of electricity is consumed in producing heat, it is wastage of electricity. Therefore it is not desirable to use.

11. Why are LED(Light Emitting Diode) bulbs being preferred?

Ans:- LED bulbs are being preferred because they consume less electricity.

12. What is ISI mark?

Ans:- ISI mark is an assurance for conformity to the specifications given on the electrical products. This mark is given by Bureau of Indian Standards, New Delhi.

13. What is an electrical fuse?

Ans:- An electrical fuse is a safety device which is made of low melting point materials. When huge amount of current is passed through the fuse, it melts and breaks the circuit, thus avoiding damages to electrical circuits and possible fires.

14. What is a compass needle?

Ans:- A compass needle is a tiny magnet which points in north-south direction.

15. Who was the first person to notice the deflection of a magnet when it was brought to a current carrying wire?

Ans:- Hans Christian Oersted.

16. What is magnetic effect of current?

Ans:- A current carrying wire produces magnetic field around it. This is known as magnetic effect of current.

17. How will you show the magnetic effect of current?

Ans:-

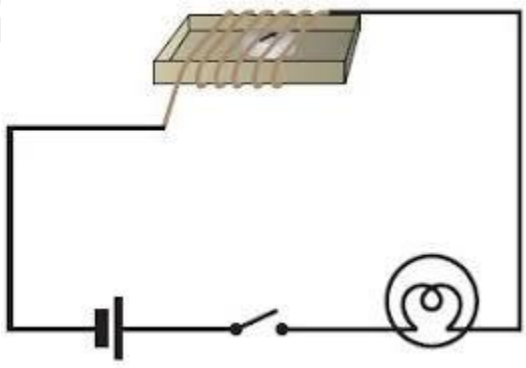


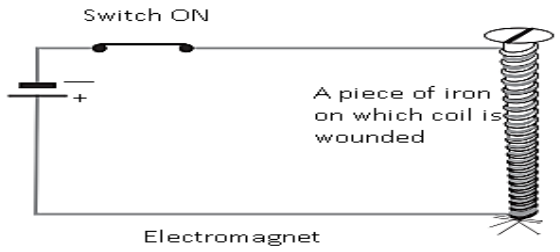
Fig. Effect of current on a compass needle

Let us take the cardboard tray from inside a discarded matchbox. It is wrapped a few times around by an electric wire. A small compass needle is placed inside the tray. The free ends of this wire are connected to an electric cell. When the switch is

'ON' the needle of the compass needle gets deflected. This shows that a magnetic field is produced by the current carrying wire.

18. What is an electromagnet? Give some appliances(uses) of electromagnet.

Ans:-



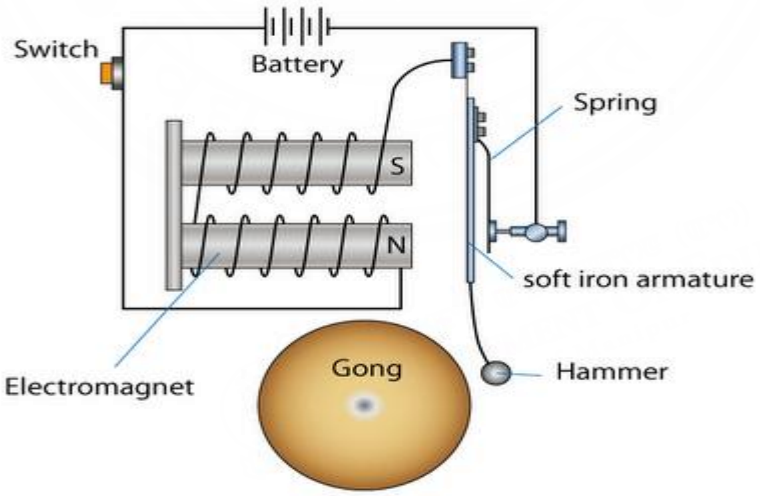
An electromagnet is a current carrying coil of an insulated wire wrapped around a piece of iron.

Some uses of electromagnets are:-

a) They are used to separate magnetic materials from the junk.
b) Doctors use tiny electromagnets to take out small pieces of magnetic materials that have accidentally fallen in the eye.
c) Many toys have electromagnet inside them.
d) A crane has a strong electromagnet attached to it to lift very heavy iron loads.

19. Explain the working of an electric bell?

Ans:-



An electric bell consists of a coil of wire wound on an iron piece which acts as an electromagnet. An iron strip with a hammer at one end is kept close to the electromagnet. There is a contact screw near the iron strip. When the iron strip is in contact with the screw, the current flows through the coil which becomes an

electromagnet and pulls the iron strip. Due to this, the hammer at the end of the strip strikes the gong of the bell to produce a sound. However, when the electromagnet pulls the iron strip, it breaks the circuit and the electromagnet no longer attract the iron strip. This process is repeated in quick sucession.
