Grade : VII

Chapter – 14. Electric Current and its Effects

Basic concepts – A Flow Chart

Electrcic current

Flow of electrons (electric charges through a conductor (wire).

Flows through

Electric Circuit

A Complete pathway for the flow of electric current.

Components of Electric Circuit

- Cell: Provides energy for the current to flow.
- Bulb: Lights up when and electric current flows through it
- Switch keeps the circuit off or on.
- Connecting wires: help to conduct the electric current and complete the circuit.

Effects of Electric Current

Heating Effects

- The amount of heat produced in a wire depends on its material, length and thickness.

Application

Fuse

- It is a safety device which prevents damage to electric circuit.
- It is made by inserting a short wire into porcelain or insulating material.

MCB

- Stands for miniature circuit breakers.
- These are switches which automatically turn off when current in a circuit exceeds the safe limit.

Magnetic Effect

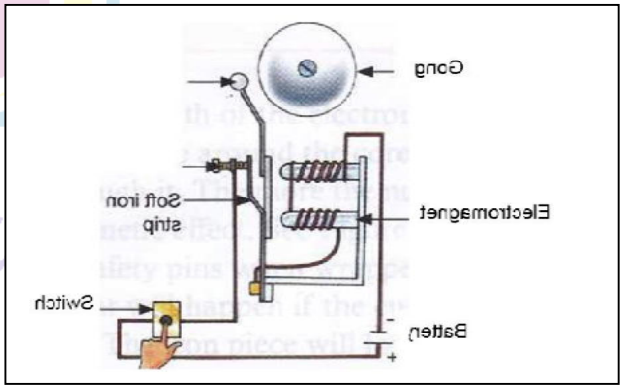
- When electric current passes through a wire, it behaves like a magnet. This is the magnetic effect of the electric current.
- First observed by hans Christian oersted.

Application

Electromagnet

- An electromagnet is a coil of wire wound on a soft iron core.
- Used to separate magnetic material from the junk.
- Doctors use tiny electromagnets to take out small pieces of magnetic material that have accidentally fallen in the eye.
- Many toys also have electromagnets inside them.

Electric Bell



Know the Terms

- **Batter** : Combination of two or more cells is called a battery.
- **Fuse** : A safety device that cuts off the electric current in a circuit if a sudden heavy current starts flowing in it.
- **Solenoid** : A cylinder coil of wire.

Objective Type Questions

(1 Mark each)

I. Multiple choice questions

1. A battery is a group of :

a. Only two cells b. Two or more cells c. Only single cell d. All of above

2. Which mark is necessary on electric appliances?

a. ISI b. FICEI c. AGMARK d. KSK

3. Who discovered magnetic effect of current ?

a. HC Oersted b. Michael Faraday c. Ohm d. Fleming

4. Which effect of current is used in an electric bulb ?

a. Heating b. Magnetic c. Electrical d. Chemical

5. The device used for measuring current is :

a. Compass b. Ammeter

c. Voltmeter d. Potentiometer

6. The amount of heat produced is a work depends on :

a. kind of material b. Thickness of material

c. Resistance of material d. All of above

7. Which depends only on the heating effect of current?

a. Hair dryer b. Room heater

c. CFL d. Electric bulb

8. Which depends only on the heating effect of current ?

a. Cu and Pb b. Pb and Sn c. Al and Sn d. Pb and Al

9. When an electric flows through a copper wire AB as shown in figure, the wire :

a. Deflects a magnetic needle placed near it becomes red hot

b. become red hot c. Gives electric shock

d. behaves like a fuse

10. Choose the statement which is not correct in the case of an electric fuse.

a. Fuses are inserted in electric circuits of all buildings

b. There is a maximum limit on the current which can safely can follow through the electric circuits.

c. There is a minimum limit on the current which can safely flow in the electric circuits

d. if a proper fuse is inserted in a circuit it will blow off if current exceeds the safe limit.

11. Three bulbs A,B,C are connected in a circuit as shown in figure. when the switch is 'ON'

a. Bulb C will glow first

b. Bulb B and C will glow simultaneously and bulb A will glow after sometime

c. All the bulbs A, B and C will glow at the same time

d. The bulbs will glow in the order A, B and C

12. When a switch is in OFF position.

i. Circuit starting from the positive terminal of the cell stops at the switch.

ii. circuit is open

iii. not current flows through it.

iv. Current flows after some time.

Choose the combination of correct answer from the following :

a. All the correct b. ii and iii are correct

c. only iv is correct d. only I and ii and correct

13. Which of the following precautions need not to taken while using electric gadets/ appliances/ circuit ?

a. We should never touch a lighted electric bulb connected to the mains

b. We should never experiment with the electric supply from the mains or a generator or an inverter.

c. We should never use just any wire or strip of metal in place of a fuse.

d. we should never turn the switch in ON position.

1. b	2. a	3.a	4.a	5.b	6. d	7. a
8. b	9. a	10. c	11. c	12. b	13. d	

II. Multiple choice questions

1. Key or switch in circuit is placed:

a) Left side of the battery b) Right side of the battery

c) Anywhere in the circuit d) Near the positive terminal of the bulb

2. The coil of wire contained in heater is known as :

a) component b) Circuit c) Element d) Spring

3.. Which mark is necessary on electric appliances?

a) ISI b)FICC c) AGMARK d) KSK

1. c	2. c	3. a

I. Fill in the blanks

1. The combination of two or more cells is _____.

2. When current is switched on in room heater. It _____.

3. Filament is made of _____.

4. Crane has a strong _____. Attached to it.

5. The coil of wire in an electric heater is _____.

6. Current does not flow in an _____ circuit.

7. _____ turn off when the current safe limit.

8. Our body is a _____ of electricity.

9. An electric cell produces electricity from the _____ in it.

10. In an electric circuit a fuse is a _____ to prevent possible fire.

1. Battery	2. Becomes hot	3. Tungsten	4. Electromagnet	5. Element
6. Open	7. MCB	8. Conductor	9. Chemicals stored	10. Safety Device

II. Fill in the blanks

1. The bulb glows in a circuit only when the switch is in the_____ position

2. The coil of wire in an electric heater is called an_____

3. The wire gets_____ when an electric current passes through it.

4. We must look for_____on electrical appliances.

1. On	2.element	3. hot	4. ISI mark

I. Match the following.

Column A	Column B
a. CFL	i. Used in place of fuse
b. ISI	ii. Electric bell
c. switch	iii. Geyser
d. Fuse	iv. Coil
e. Element	V. Safety device
f. Heating effect of current	vi. ON / OFF
g. Magnetic effect of current	vii. safe to use
h. Miniature circuit breaker	viii. Less energy consumption

a. viii	b. vii	c. vi	d. v	e. iv	f. iii	g. ii	h. i

II. Match the following.

Column A	Column B
(i) CFL	(a) A safety device to prevent short circuit
(ii) ISI	(b) The wire used in heater to get heat
(iii) Switch	(c) Consume less energy than bulb
iv) Fuse	d) Appliance is safe to use
v) Element	e) Turns the circuit ON or OFF

i. c	ii. d	iii. e	iv. a	v. b

Quiz Time

1. What type of electricity is it called when charges are at rest?
2. What happened when charges start to flow in a conductor?
3. Name types of electricity
4. Name two devices which work on the principle of heating effect of electricity
5. What are the main components of a simple circuit?
6. In which position of key does the bulb glow- in closed or in open position?
7. Prepare a list of such appliances which work on the basis of heating effect of electricity.
8. Name any two devices which work on the basis of magnetic effect of electricity.
9. What is the wire of a coil contained in heater called?

1.Static electricity	2. Current electricity is formed
3.i)Static energy, ii)Current electricity	4. i) Heater ii) Electric bulb
5. i)wire ii) Batteryiii) Bulbiv key	6. In closed position
7. Bulb, iron, heater and toaster	
8.. i) Electric bellii) Loudspeaker	9.. Element

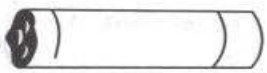
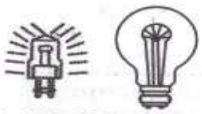
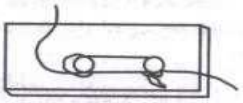
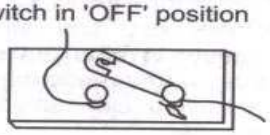
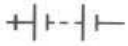
NCERT Corner

I. Intext Questions.

1. Do you know what a battery is?

Two or more cells are connected together such that the positive terminal of one cell is connected to the negative terminal of the next cell. Such a combination of cells is referred to as a battery.

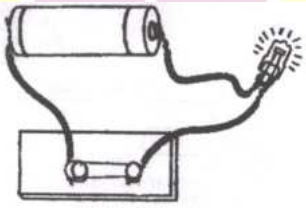
2. Draw the symbols of electric cell, electric bulb, switch in 'ON' position , switch in 'OFF' position, battery and wire, along with their original diagram.

S. No.	Electric Component	Symbol
1.	Electric cell 	
2.	Electric bulb 	
3.	Switch in 'ON' position 	
4.	Switch in 'OFF' position 	
5.	Battery 	
6.	Wire 	

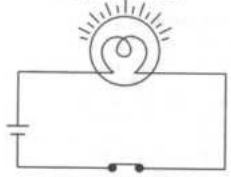
3. Paheli and Boojho wonder whether the batteries used in tractors, trucks and inverters are also made from cells. Then why is it called a battery? Can you help them to find the answer to this question ?

The battery employed in tractors, truck etc. is a combination of several cells. The cells are not dry cells. These are several sets of plates. Each set of plates functions like a cell.

4. Copy this electric circuit in your notebook. Make also a circuit diagram of this circuit using symbols for the various electric components.



Original Circuit



Circuit Diagram

5. If the filament f the bulb is broken, would the circuit be complete ? would the bulb still glow?

No, Neither the circuit be complete, nor the bulb will glow.

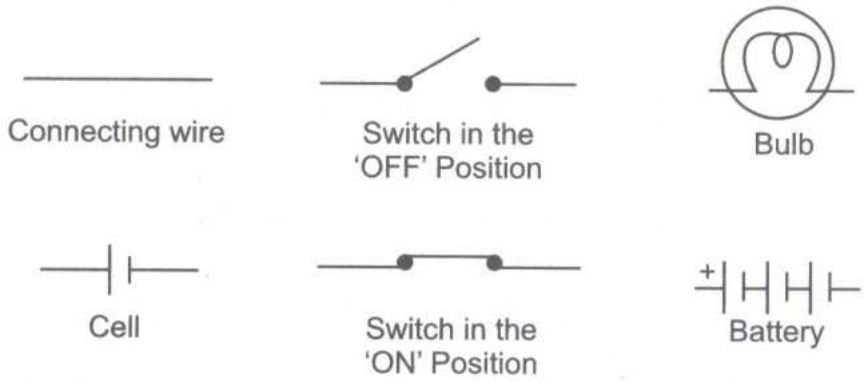
6. Can you think of any electric appliance where the heating effect of the electric current is used? Make a list such appliances.

i. Electric heater, ii. Electric iron iii. Electric toaster,

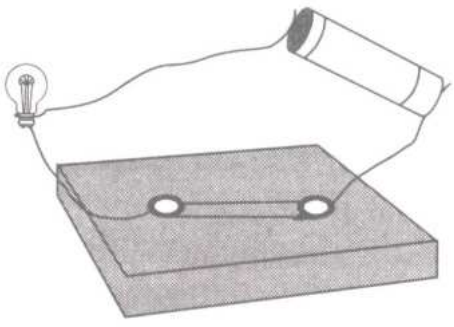
iv. Electric oven, v. Electric bulb.

Textbook questions

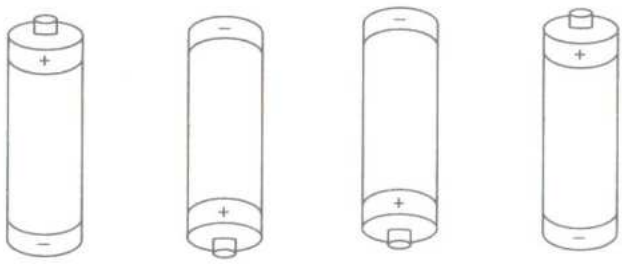
1. Draw in your notebook the symbols to represent the following components of electrical circuits; connecting wires, switch in the 'OFF' position, bulb, cell, switch in the 'ON' position and battery.



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



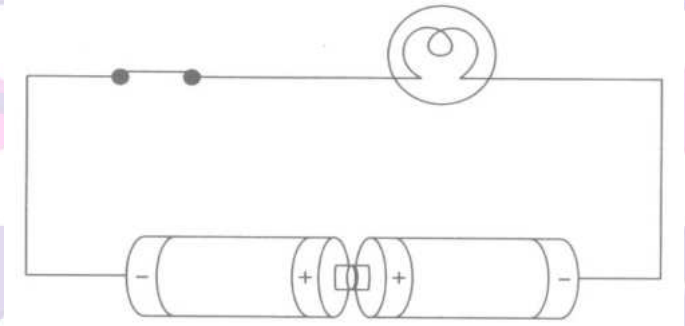
3. Fig. 14.22 shown four cells fixed on a board. Draw lines to indicate you will connect their terminals with wires to make a battery of four cells.



4. The bulb in the circuit shows in Fig. 14.23 (T.B.) does not glow. Can you identity the problem ? make necessary changes in the circuit to make the bulb.

The problem with the circuit is that both the negative terminals are selected to the bulb.

Correct given diagram :



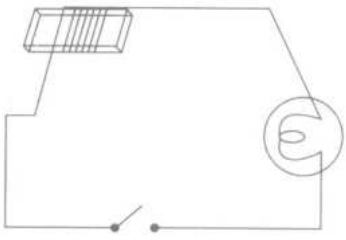
5. Name any two effects of electric current .

Heating effect, ii. magnetic effect.

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

When electric current passes through a wire, it acts like a magnet. This is the magnetic effect of the electric current caused by the attraction of the wire. So, the compass needle which is a magnet will be deflected.

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



No, as There is no cell, so no current can flow.

8. Fill in the blanks.

a. When current is switched 'on' in a room heater, it _____.

b. The safety device based on the heating effect of electric current is called a ____.

a. get heated	b.. 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.

a. F	b. T	c. F	d. T

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

No, Electromagnets will never attract plastics.

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.

No, the electric fuse will not melt even when high current flows through or it will not stop the damage done by high current.

12. Zubeda made an electric circuit using a cell holder shown in the following Fig. 14.21 (T.B.), a switch and 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.

Zubeda connected the two ends of a cell with a conducting wire which is known as short circuit.

I. Very Short Answer Type Question.

1. What do you mean by an electric circuit?

The path through which electric charges move from one point to other is called electric circuit.

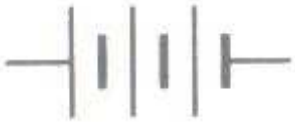
2. Name some components of electric circuit

Battery, wire, key and bulb are the components of a simple electric circuit

3. In which position key is placed in a circuit ?

Key can be placed anywhere in the circuit.

4. What is the symbol of a battery?



5. Which part of the symbol of battery shows positive and negative terminals?

The longer line represents the positive and shorter line represents the negative terminal of the battery.

6. What is battery?

When two or more cells are joined together, then it is called battery

7. How can we connect the cells to prepare battery?

The positive terminal of one cell is connected to the negative terminal of the next cell to prepare a battery.

8. What do you mean by closed circuit?

Closed circuit means switch is in on position

9. What do you mean by open circuit?

Open circuit means switch is in off position.

10. Does bulb glow when the circuit is open?

No, the bulb does not glow when the circuit is open.

11. Would the circuit be complete if the filament of a bulb is broken?

No, circuit will not be complete

12. What are the effects of electricity?

There are three effects of electricity:

13. What do you mean by heating effects of electricity?

The wire gets hot when an electric current passes through it. This is called heating effect of electricity.

14. On which effect does electric iron work?

Heating effect of electricity

15. Make a list of such appliances which work on the basis of heating effect of current

Bulb, iron, heater, toaster, geysers etc.,

16. What is element in respect of heating effect of electricity?

The coil of wire is called an element

17. On what factors does the heat produced in a wire depend?

Amount of heat produced in a wire depends on its material, length and thickness

18. Name the device which is used in our houses to protect the appliance and work on the basis of heating effect

Electric fuse

19. Write full form of CFLs

Compact Fluorescent Lamps

20. How can we reduce the wastage of electricity?

The wastage of electricity can be reduced by using CFLs

21. What do you mean by magnetic effect of electricity?

When electric current passed through a wire, it behaves like a magnet. This is called magnetic effect of electricity.

22. Name two devices that work on the basis of magnetic effect of electric current. Electric current.

Electric bell and loudspeaker.

23. Write the name of the scientist who discovered the magnetic effect of electric current.

Hans Christian Oersted (H.C,Oersted)

24. For which mark should we look at an electrical appliance before buying ?

ISI mark

25. What is electricity?

The flow of charges is called electricity

26. What are the components of an electric circuit?

The various appliances which are connected in electric circuit are called its components.

27. Name the terminal of the cell

i) Positive terminal ii) Negative terminal

28. Name some devices in which battery is used

Torches, Transistors and Toys etc.,

29. What do you mean by switched on?

The closed circuit is called switched on.

30. What is meant by switched off?

The open circuit is called switched off

31. What is the position of key in the circuit?

The key may be placed at any place in the circuit.

32. Draw a symbolic diagram of a battery having four cell

33. What is the full form of LED?

Light emitting diode.

II. Very Short Answer Type Question.

1. What are the effects of electricity?

i. Heating effect

ii. Chemical effect

iii. Magnetic effect.

2. What do you mean by heating effect electricity?

The wire gets hot when an electric current passes through it. This is called heating effect of electricity.

3. On what factor does the heat produced in a wire depend?

Amount of heat produced in a wire depends. On its material length and thickness.

4. Name the device which is used in our house to protect the appliances and work on the basis of heating effect.

Electric fuse.

5. Write full form of CFLs.

Compact fluorescent lamps.

6. How can we reduce the wastage of electricity?

The wastage of electricity can be reduced by using CFLs.

7. Which property of a conducting wire is utilized in making electric fuse?

Low melting points.

8. Name the device used these days in place of electric fuses in electrical circuits.

MCB (Miniature Circuit Breaker)

9. Why is an electric fuse required in all electrical appliances?

To check the excessive flow of electric current.

10. Why are compact fluorescent lamps (CFLs) preferred over electric bulbs ?

CFL do not waste electricity as heat.

11. Paheli does not have a night lamp in her room. She covered the bulb of her room with a towel in the night to get dim light. Has she taken the right step? Give one reason to justify your answer.

No, the towel may burn due to the heat produced by the bulb. Besides, it will also result in wastage of electric energy.

III. Very Short Answer Type Question.

1. Why is good fuse wire made of tin?

A good fuse wire is made of tin as it has a low melting point

2. Paheli does not have a night lamp in her room. She covered the bulb of her room with a towel in the night to get dim light. Has she taken the right step? Give one reason to justify your answer.

No, the towel may burn due to the heat produced by the bulb. Besides, it will also result in wastage of electric energy.

3. Why are compact fluorescent lamps (CFLs) preferred over electric bulbs?

CFL s do not waster electricity as heat.

4. Why is an electric fuse required in all electrical appliances?

To check the excessive flow of electric current

5. What is an electromagnet?

An electromagnet is a coil of wire wound on a soft iron core which acts as a magnet due to the magnetic field of electric current.

6. What is the fuse rating in the lighting and fans circuit of a small house?

The fuse rating is the maximum current that the fuse can carry without melting.

I. Short Answer Type Question.

1. Can we use the same fuse in a geyser and a television set? Explain. [NCERT Exemplar]

No, a geyser and a television set require different amount of current. Therefore the fuse used in these will be of different ratings.

2. Name two electric devices for each where heating effect of current is used and magnetic effect of current is used. [NCERT Exemplar]

Heating effect: Geyser, room heater Magnetic effect: Electric bell, cranes to lift magnetic material

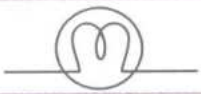
3. Why do we cover plug pin holes which are within the reach of children with cellotape or a plastic cover when not in use? [NCERT Exemplar]

The child may put his/her fingers into he socket and he/she may get an electric shock which could be fatal.

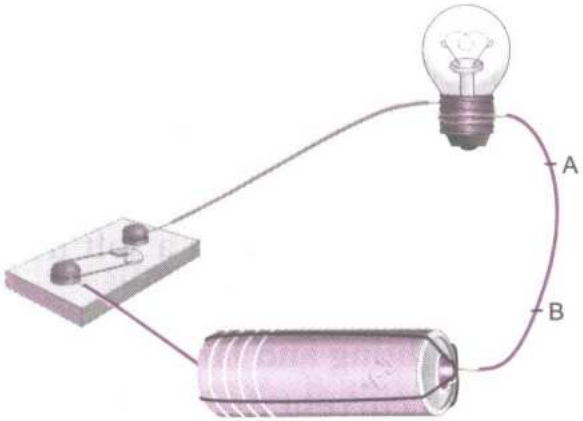
4. Boojho made an electromagnet by winding 50 turns of wire over an iron screw. Paheli also made an electro magnet by winding 100 turns over a similar iron screw. Which electromagnet will attract more pine? Give reason [NCERT Exemplar]

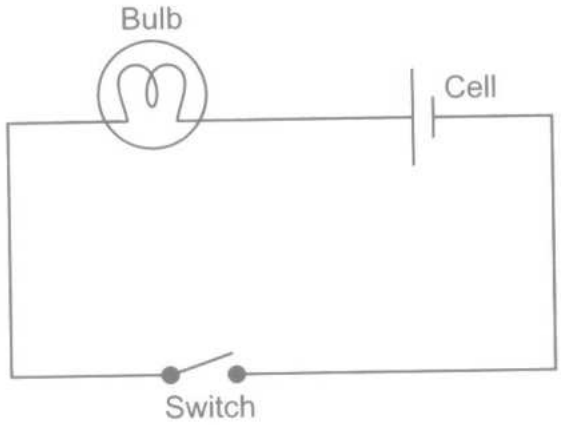
Paheli 's electromagnet will attract more pins as it has more number of turns of wire on it and thus, a stronger electromagnet.

5. Draw in your note book 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. [NCERT]

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

6. Draw the circuit diagram to represent the circuit shown below : [NCERT]





7. The figure below 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

To make a battery, the negative terminal of one cell must be connected to the positive terminal of the next cell with the help of connecting wires.

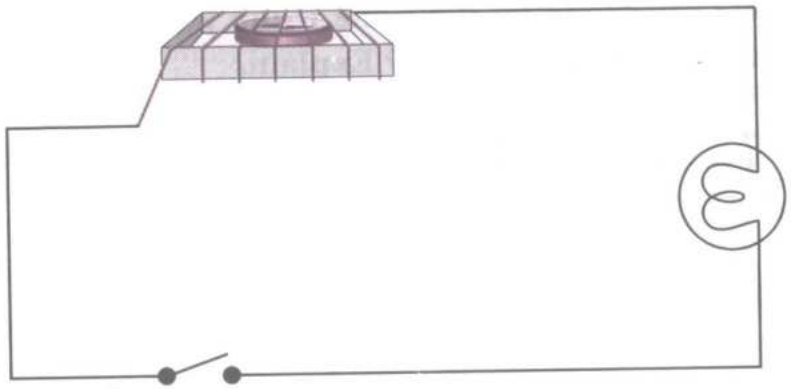
8. Name any two effects of electric current

The two effects of electric current are:

a) Heating effect of electric current

b) Magnetic effect of electric current.

9. Will the compass needle show deflection when the switch in the circuit shown by figure given below is closed?



No, since the given circuit does not have any current source, the wire does not behave as a magnet and hence, the compass needle will not show any deflection.

10. What are the electric fuses? Why are they important?

A fuse is a safety device in an electric circuit. It is made by inserting a short wire into an insulating material. Fuses are used so that if a fault occurs and too much current flows, the fuse wire melts before anything else is damaged.

11. ON what factors does the heat produced in a wire depend?

The heat produced in a wire depends on the current flowing in the wire and the resistance of the wire.

12. On what factors does the strength of an electromagnet depend?

The strength of an electro magnet depends on the current passing through the coil and the number of coils around the trains.

13. Write four uses of electromagnets.

a) Used in cranes in steelworks and scrapyards.

b) Used to remove foreign bodies like iron filings from a patient's body.

c) Used in electric bells, loudspeakers, etc.

d) Used in modern tams and trains

14. How do short circuits occur?

Short circuits occur when the positive and negative terminals of a battery are connected by a low resistance wire, leading to the flow of large amount of current and in turn larger energy which the wire cannot carry and result in an explosion.

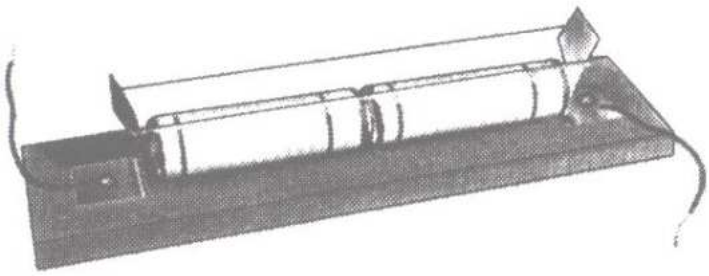
15. When the current is switched on through a wire, a compass needle kept nearby gets deflected from its north-south position. Explain

When a current is switched on through a wire, the wire starts behaving as a magnet Hence when a compass needle is placed near the given current carrying wire, it get influenced by the magnetic effect of electric current and gets deflected from its north south position.

II. Short Answer Type Question.

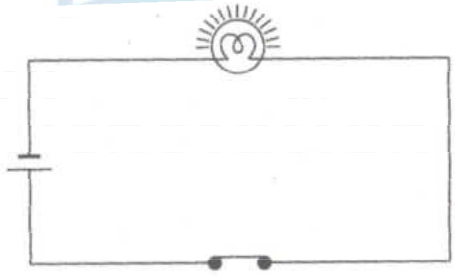
1. Explain the construction of battery

Battery is a combination of two or more cells. This can be constructed by placing cells properly on cell holder such that the positive terminal of one cell is connected to the negative terminal of the other. A piece of wire is connected to each of the two metal clips on the cell holder.



2. What do you mean by a closed circuit with respect to the on-off switch.

When the switch is in ON position then the circuit from the positive terminal of battery to the negative terminal is complete. The circuit is then said to be closed and the current flows through the circuit instantly and bulb starts glowing.

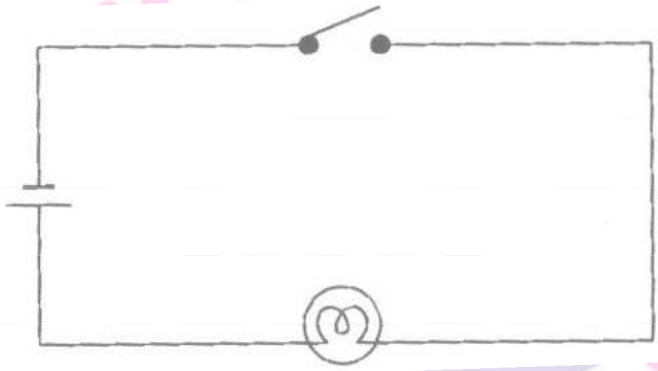


3. Why should we not touch a lighted electric bulb ?

We should never touch a lighted electric bulb connected to the mains. It may be very hot and our hand may get burnt badly. In the same way we do not experiment with the electric supply from the mains or a generator or an inverter. It may cause an electric shock.

4. What do you mean by an open circuit?

When the switch is in off position, then the circuit from the positive terminal of battery to the negative terminal is not complete. The circuit is then said to be opened and the current does not flow through the circuit and bulb does not glow.



5. How do the electric heater or an electric iron work?

Electric heater and iron work on the basis of heating effect of electricity. When an electric current passes through the wires they become hot. Electric heater or iron contains a coil of wire. This coil of wire is called an element. When these appliances are switched on after connecting to the electric supply, their elements become red hot and give out heat.

6. What are CFLs? Why are CFLS? Preferred over electric bulbs?

An electric bulb is used for light but it also gives heat. This is not desirable. This results in the wastage can be reduced by using fluorescent tube lights (CFLs) in place of the bulbs. CFLs are also used to reduce wastage of electricity. These are compact fluorescent lamps. These can be fixed in ordinary bulb holders.

7. Explain the reasons of excessive currents in our houses.

(i) Direct touching of wires :

This may happen if the insulation on the wires has come off due to wear and tear. This may cause a short circuit

(ii) Connection of many devices to a single socket:

This may cause over load in the circuit.

8. What are electric fuses? What is their importance?

Fuse is a safety device which prevents our houses, appliances and electric circuit from electrical hazards at the time of the short circuiting or overloading. The fuse works on the basis of heating effects of the electric current. If by an accident the current exceeds a certain limit this device becomes overheated and melts which breaks the circuit and supply of electricity is stopped. In this way it helps in prevention of short circuits.

9. What are MCBs? How do they work?

MCB s (Miniature Circuit Breakers) are switches which automatically turn off when current in a circuit exceeds the safe limit. We turn them on and the circuit is once again complete.

Miniature circuit Breaker

10. What happens when a compass needle is brought near to a current carrying wire?

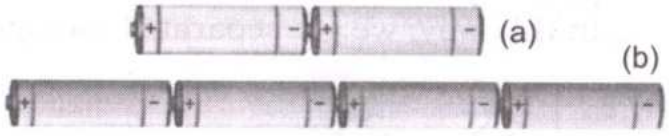
Compass needle is a tiny magnet which points in north-south direction. When it is brought close to a magnet then needle gets deflected. When compass needle is brought near to a current carrying wire then it is deflected and when direction of current is changed then direction of deflection of compass needle is also changed . This shows the magnetic effect of electricity.

11. Write the differences between a bar magnet and an electromagnet.

Bar Magnet	Electromagnet
1. It is permanent magnet 2.Its strength cannot be changed	1. It is a temporary magnet 2. Its strength can be changed
3.It uses are limited	3. Its uses are more wide

12. Define the term battery. How is it formed?

When two or more cells are connected with each other then such device is called battery. To form a battery, the cells are kept in a cell holder in such a way that the positive terminal of one cell is connected to the negative terminal of other cell and so on. A metal wire is connected to each of the two metal clips on the cell holder.



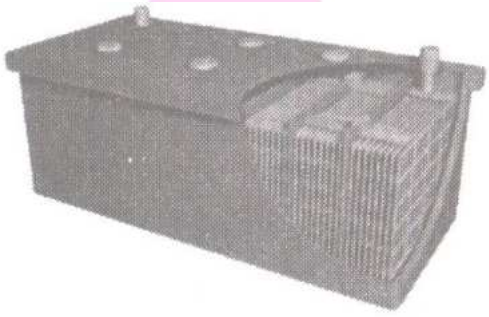
(a) Battery of two cells (b) A battery of four cells

Connecting two cells together to make a battery.

13. What is storage battery? Write its uses.

A battery used in tractors and trucks is called storage battery. When higher current is required for a long time then storage batteries are used. Storage batteries are advantageous to use as they can be charged again and again. This battery is not to be replaced by new one very frequently.

Uses: Storage batteries are used in motor cars, railway carriages, bus and trucks.



Truck battery and its cut out

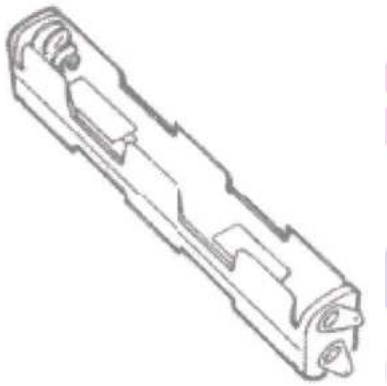
14. Why LEDs are preferred over CFLs?

LED bulbs consume less electricity as compared to incandescent bulbs or fluorescent tubes or CFLs to produce a given intensity of light. Thus they are much electricity efficient and are being preferred.

III. Short Answer Type Question-I

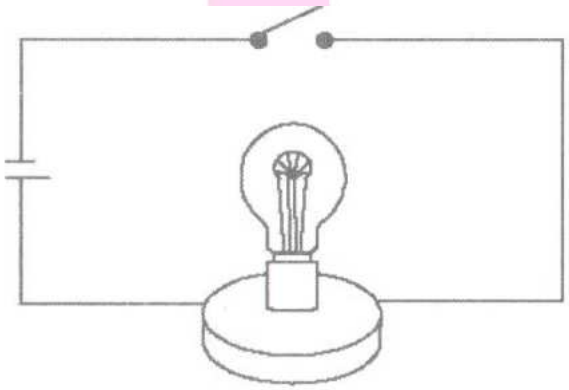
1. Explain the construction of battery.

Battery is a combination of two or more cells. This can be constructed by placing cells properly on cell holder such that the positive terminal of one cell is connected to the negative terminal of one cell is connected to the negative terminal of the other. A piece of wire is connected to each of the two metal clips on the cell holder.



2. What do you mean by open circuit?

When the switch is in off position then the circuit form the positive terminal of battery to the negative terminal is no complete . the circuit is then said t ob opened and current does not flow throughout the circuit and bulb does not glow.



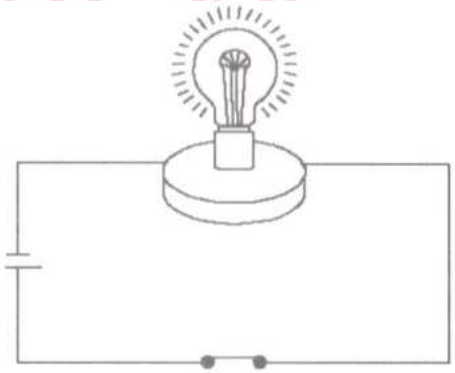
A circuit diagram showing open circuit.

3. Why should we not touch the lighted bulb?

We should never touch a lighted electric bulb connected to the mains. It may be very hot and our hand may get burnt badly. In the same way, we do not experiment with the electric supply form the mains or a generator or an inverter. It may cause an electric shock.

4. What is a closed circuit with respect to the on off switch?

When the switch is in ON position then the circuit form the positive terminal of battery to the negative terminal is complete. The circuit is then said to be closed and the current flows throughout the circuit instantly and bulb starts glowing.



Circuit diagram of electric to show closed circuit.

5. Explain the reasons of excessive currents in our houses.

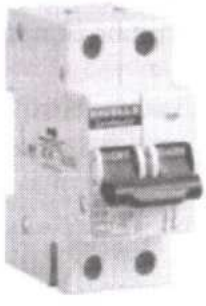
There are following two reasons of excessive currents in our houses.

i. Direct touching of wires : This may happen if the insulation on the wires has come off due to wear and tear. This may cause a short circuit.

ii. Connection of many devices to a single socket. This may overload in the circuit.

6. What are MCB s? How do they work?

MCBs (miniature circuit breakers) are switches which automatically turn of when current in a circuit exceeds the safe limit. We turn them on and the circuit is once again complete.



7. Differentiate between open circuit and closed circuit.

S.No	Open circuit	Closed circuit
1	Switch is on 'ON' Position	Switch is on 'OFF' position.
2	Current flows	There is no flow of current.
3	Electric appliances work.	Electric appliances do not function.

8. Why do we cover plug pin holes which are within the reach of children with cellotape or plastic cover when not in use?

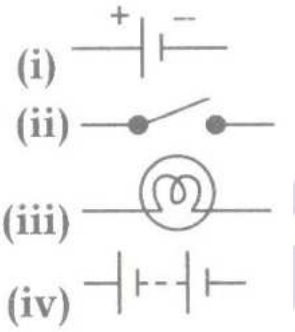
The child may put his/her finger s into the socket and he/she may get an electric shock which could be fatal.

9. Name two electric devices for each where I heating effect of current is used and ii. magnetic effect of current is used.

Heating effect – Geyser, room heater Magnetic effect – Electric bell, Cranes to lift magnetic material.

10. Draw the symbols of the following circuit components.

i. electric cell ii. Switch in off position iii. Electric bulb iv. Battery



11. Can we use the same fuse in geyser and a television set? Explain. (NCERT Exemplar)

NO, a geyser and a television set require different amount of current. Therefore the fuse used in these will be of different ratings.

12. Unscramble the following words:

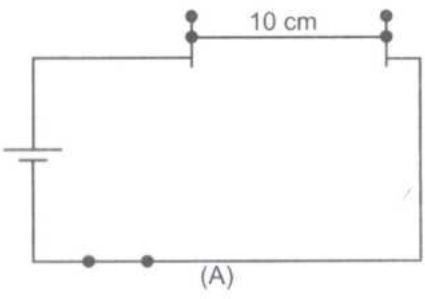
i. Tbtayer ii. Sfeu iii. Htrco iv. Lcwts

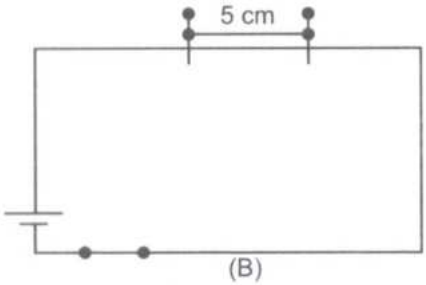
i. Battery ii. Fuse iii. Torch iv Switch

13. Paheli took a wire of length 10 cm. Boojho took a wire of 5 cm or the same material and thickness. Both the circuits is the same.

i. Will the heat produced in both the cases be equal explain.

ii. Will the heat produced be the same if the wires taken by then are of equal lengths but of different thickness? Explain.





(B)

i. No, the amount of heat produced in both the cases will not be equal. Amount of heat produced in a wire depends upon the length of the wire.

ii. No, the amount heat produced in the wire depends upon the thickness of the wire.

III. Short Answer Type Question- II

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

When current is passed through the wire, it deflects the compass near it from its north – south position like a magnet. This is called magnetic effect of the current. As we know that needle comes in contact with another magnet then the like poles of the magnet repel each other. So the deflection is seen in the needle. In this case the wire behaves like a magnet and causes deflection in needle of the compass.

2. What happens when a compass needle is brought near to a current carrying wire?

Compass needle is a tiny magnet which points in north- south direction. when it is brought close to a magnet then needle gets deflected. When compass needle is brought near to a current carrying wire then it is deflected and when direction of current is changed then direction of compass needle is also changed. This shows the magnetic effect of electricity.

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5. How do the electric heater or an electric iron work?

Electric heater and iron work on the basis of heating effect of electricity. When an electric current passes through the wires they become hot. Electric heater or iron contains a coil of wire. Coil of wire is called an element. When these appliances are switched on after connecting to the electric supply. Their elements become red hot and give out heat.

6. Distinguish between a bar magnet and an electromagnet.

Difference between a bar magnet and an electromagnet.

S.No	Bar magnet	Electromagnet
1	It is permanent magnet	It is temporary magnet
2	its strength cannot be changed	Its strength can be changed.
3	its uses are limited	Its uses are more wide.

7. a. Why does a glowing electric bulb become warm?

b. Mention any two effects of electric current.

c. Why does a glowing CFL not become warm?

a. Part of electricity supplied produced heating effect.

b. Electricity produces two effects

i. Heating effect

ii. Magnetic effect

c. The electricity supplied is mostly used to produce light and heating effect is minimum.

8. a. How is the electric appliance, if earthed, is useful?

b. what determines the thickness of the main live wire in your household?

a. Sometimes, due to faulty wires, the insulation breaks and the live wire come in contact with the body of the appliance. If the appliance is earthed, the charge flows to the each and protects us form electric shock.

b. The maximum value of current is determined by the thickness of the main live wire.

9. State the conclusions of H.S. Oersted from his experiments on the deflection of a compass needle when current was passed through the wires around it.

When current was passed through a wire around a compass needle, H,S. Oersted concluded.

a. When an electric current is passed through a wire. It behaves like a magnet,

b. The magnitude of magnetic field increases with the intensity of current.

c. The induced magnetic field is at right angles to the direction of the flow of electric current.

10. i. What is the heating effect of electric of current?

ii. Name two appliances that make use of heating effect of electric current.

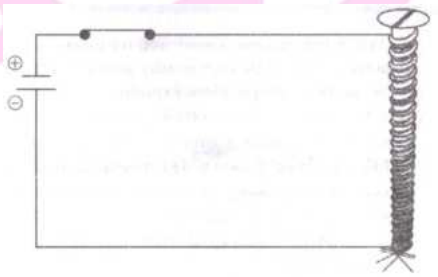
iii. Name the safety device based on the heating effect of electric current.

i. The wire gets hot when electric current passes through it this property of electric current is called as heating effect of current.

ii. Electric bulb and hair Dryer

iii. Electric Fuse

12. Your teachers has shown you the following activity.



Activity : Teacher has wound a long insulated piece of wire around and iron nail in the form of a coil. Free ends of the wire are connected to a cell through a switch as shown in the figure . the current is switched on and some pins are placed near the ends of the mail.

Write down any three questions that come to your mind about activity.

Some of the questions can be

i. Why does the nail attract the pins?

ii. What will happen if we connect more cells in the circuit?

iii. What will happen if we use some other material like a straw in place of the nail?

iv. What will happen if we wrap the wrap the wire on the nail mare tightly?

Or

Any other appropriate question.

I. Long Answer Type Question-I

1. What do you understand by electric circuit? Write its components.

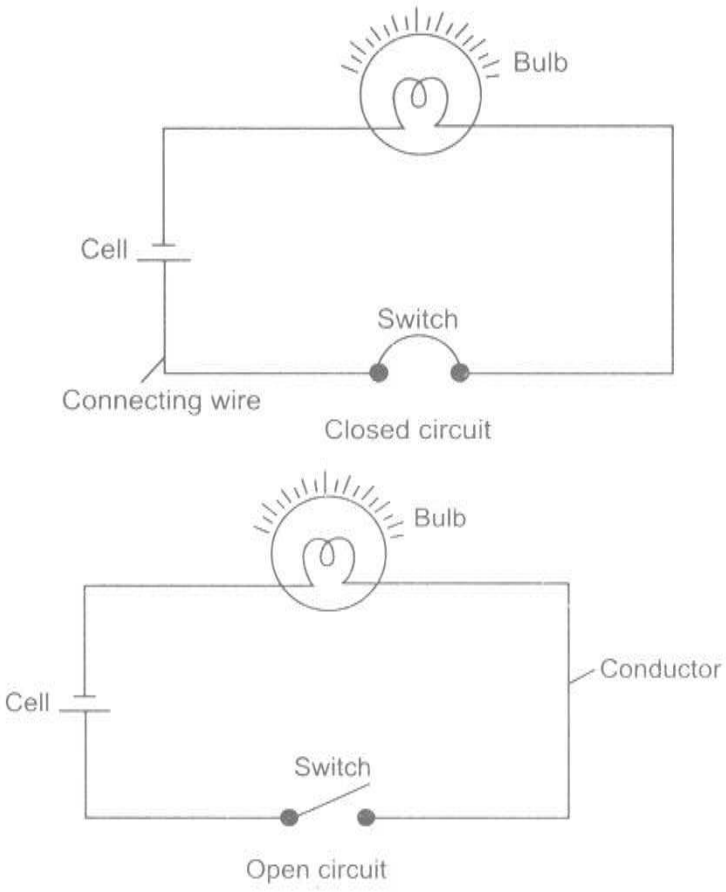
Electric circuit : the path along which an electric current can flow is called electric circuit. The components of an electric circuit are;

i. The cell or battery - the source of electrical energy,

ii. The connecting wires or conductors,

iii. The bulb – that uses the current

iv. Switch – to close or open the circuit. The simplified circuit diagram is given below with components and their symbols;



2. What is an electromagnet? Write its uses.

When current is passed through a coil of wire then the coil behaves like a magnet, one end of coil acts as north pole and other end acts as south pole.

When the electric current is swithed off, the coil generally loses its magnetism. Such coils are called electromagnets. The electromagnets are very strong and their power can be increased so they are very important.

Two important applications (uses) of electromagnets are :

i. They are used in electric bells, telegraphs, telephones and speakers etc.

ii. They are used in cranes to lift heavy loads of scrap iron or iron sheets.

II. Long Answer Type Question.

1. What is an electromagnet? Write its uses.

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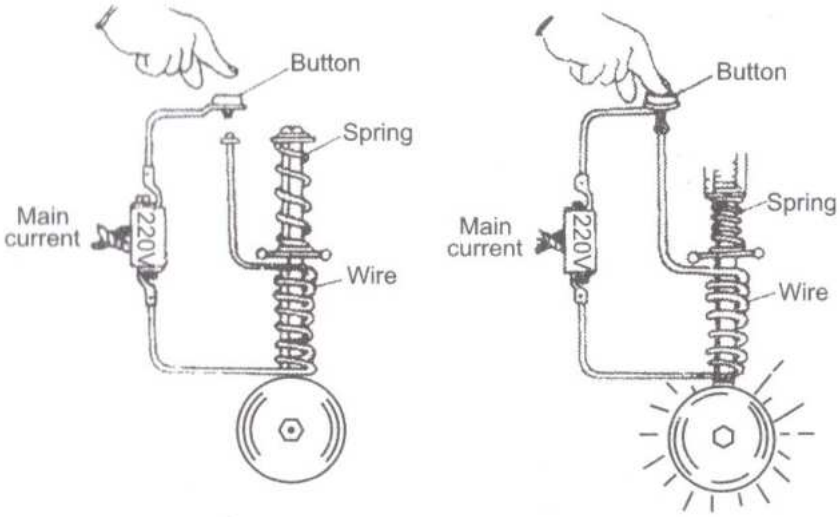
(i) They are used in electric bells, telegraphs, telephones and speakers etc.

(ii) They are used in cranes to lift heavy loads of scrap iron or iron sheets.

2. Explain the working of electric bell with diagram

Electric bell consists of an iron hammer around which a wire is wound. When current is passed by pressing button, the sire turns into a temporary magnet. The hammer is attracted towards gong to make sound. When this strikes, the current is disconnected automatically. It happens due to shift arrangement in it. The magnetic property of wire is lost and it comes back of its original position through a spring. In this way, we get separated hammering resulting in ringing of an electric bell.



An electric bell

3. What are short circuit and over loading?

Short circuit: When the insulation on wires has come off due to wear and tear, then the wires come in direct contact [or touching wires]. The excessive currents flow in the circuit. This may cause a short circuit.

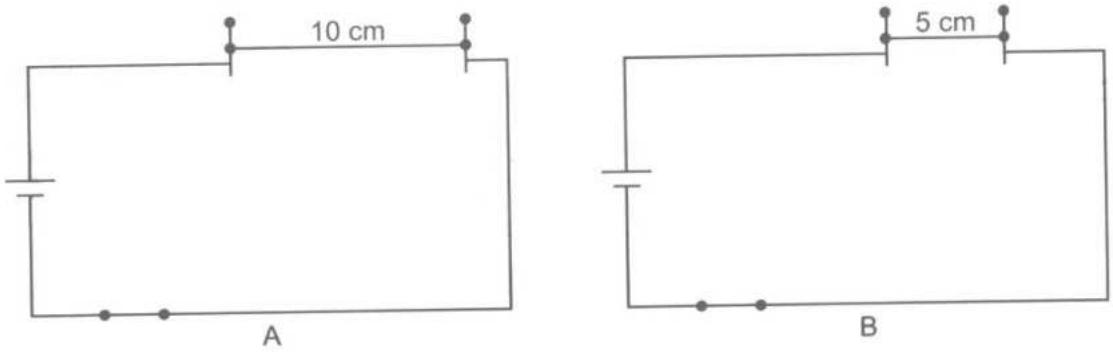
Overloading: Another reason for excessive current can be the connection of many devices to a single socket. This may cause over loading in the circuit. These two hazards cause damage to circuit and appliances.

III. Long Answer Type Question.

1. Paheli took a wire of length 10 cm. Boojho took a wire of 5 cm of the same material and thickness, Both of them connected the wires as shown in the circuit given in figure. The current flowing in both the circuits is the same. [NCERT Exemplar]

a) Will the heat produced in both the cases be equal? Explain

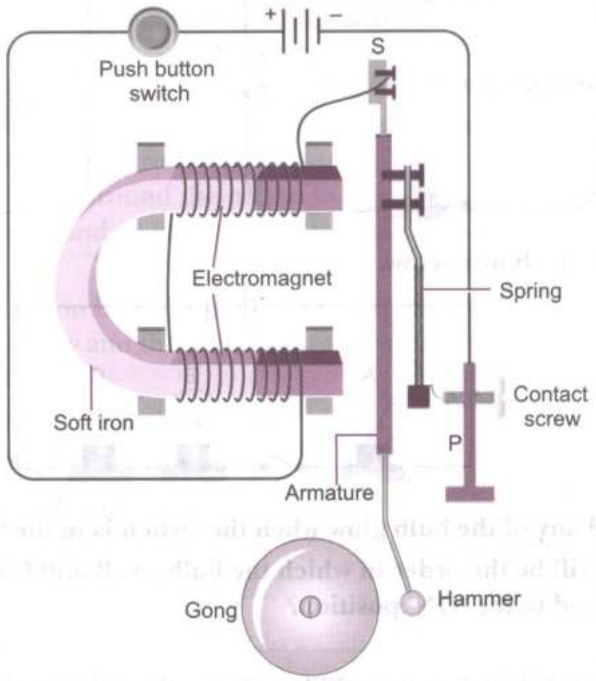
b) Will the heat produced be the same if the wires taken by them are of equal lengths but of different thickness ? Explain.



(a) No the amount of heat produced in both the cases will not be equal. Amount of heat produced in a wire depends upon the length of the wire.

(b) No, the amount of heat produced in the wire depends upon the thickness of the wire.

2 How does the magnetic effect of electric current help in the working of an electric bell? Explain with the help of a diagram. [NCERT Exemplar]

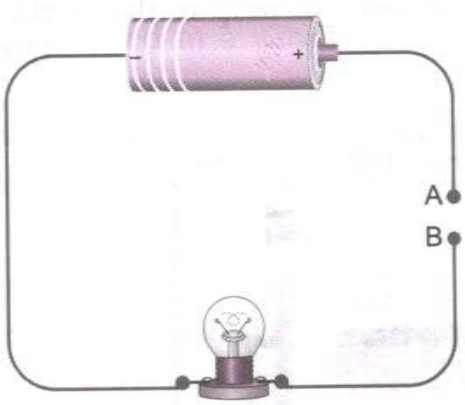


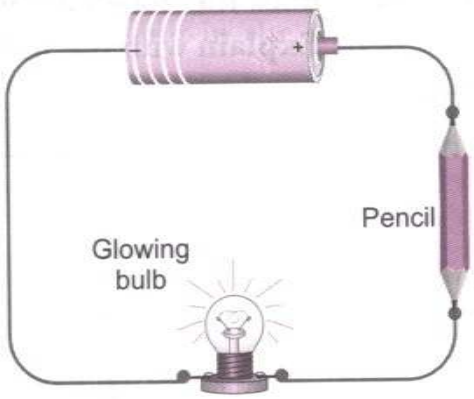
Working of an electric bill

- When the bell is pressed, the contact screw touches the iron strip and the circuit is completed
- The current starts flowing through the coil.
- The electro magnet becomes magnified and the soft iron armature is attracted towards the electromagnet, The movement of the iron armature is attracted towards the electromagnet. The movement of the iron causes the hammer to hit the gong.
- This movement breaks the circuit at point P, so that that current stops flowing and switches off the electromagnet
- Te spring pulls the armature back to its original position the circuit is remade and the process starts over again. This is how the bell rings.

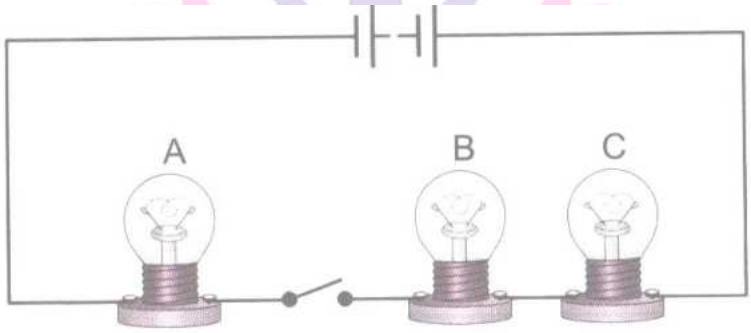
3. Describe a simple experiment to show that the bulb lights up when an electric circuit is complete and vice- versa.

- Take a dry cell , a small torch bulb(fitted with a holder) and a copper connecting wire.
- Connect the dry cell, the bulb and the copper wire as shown below
- Leave a gap in this connection and mark it as AB.
- Due to the gap AB the circuit is not complete and the bulb does not glow.
- Take a pencil and fit it in the AB.





4. In the circuit shown below.



a) Would any of the bulb glow when the switch is in the 'OFF' position?

b) What will be the order in which the bulbs A, B and c will glow when the switch is moved to the 'ON' Position?

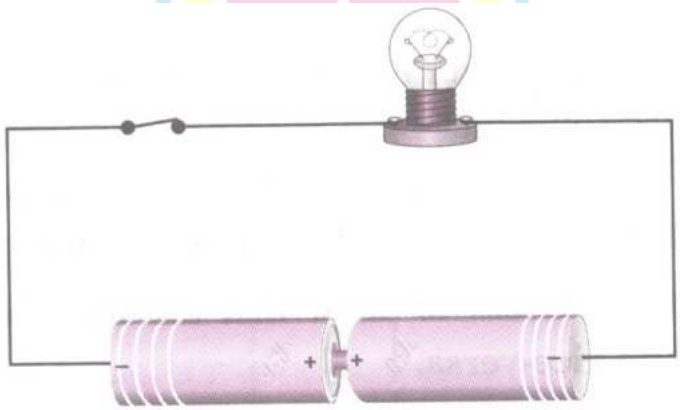
a) No.

When the switch is in 'OFF' position, the current does not flow through the circuit. Hence, none of the bulbs will glow.

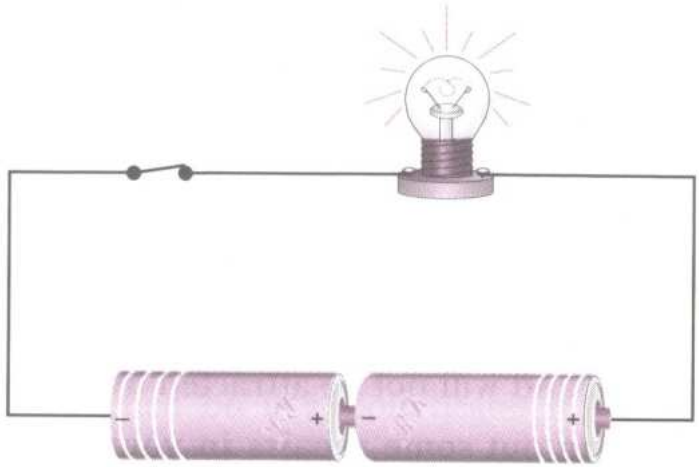
(b) Bulbs will glow simultaneously.

When the switch is moved to the 'ON' position, then all the bulbs will glow at once. This is because they all are connected to the same battery and switch.

5. The bulb in the circuit shown in figure below does not glow. Can you identify the problem? Make necessary changes in the circuit to make the bulb glow.



The bulb in the circuit is not glowing because the two cells are not connected properly. To make the bulb glow, the negative terminal of one cell should be connected to the positive terminal of the other cell, as shown in the given figure



6. With the help of an activity explain the making of an electromagnet

Materials required : A large iron, nail, thin, coated copper wire, a low voltage dry cell some paper clips, switch, electric tape.

- Wind the wire tightly around the nail so that you have at least 25 turns. Keep the turns close together and always wind in the same direction. Try not to overlap the wires.
- Remove the insulation from the ends of the wire and attach one end of the wire to one end of the battery and the other end of the wire to the other end of the battery through. A switch.
- Close the circuit by closing the switch
- The electromagnet is ready.

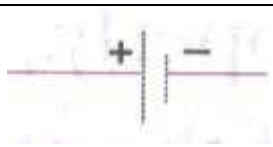
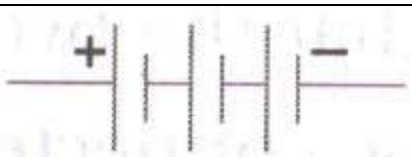
7. Distinguish between the following:

a) Cell and Battery

b) An open Switch and A close Switch

a)

S. No.	Cell	Battery
1.	A cell is a singular unit that produces electric current	A battery is composed of many cells
2.	A cell can be a battery	A battery cannot be a cell
3.	The symbol of a cell is	The symbol of a battery is

b)

S.No.	An open switch	A close switch
1.	An open switch does not allow current to pass through the	A battery is composed of many cells
2.	A cell can be a battery	A battery cannot be a cell
3.	The symbol of a cell is 	The symbol of a battery is 

I. High Order Thinking Skills (Hots) Question.

1. Batteries used in tractors, trucks and inverters are also made form cells. Thenwhy it is called a battery?

It trucks, tractors and inverters, cells are internally arranged and we need not to connect it internally, so we called it is batteries.

II. High Order Thinking Skills (Hots) Question.

1. Do you think an electromagnet can be used for separating plastic gags form garbage heap? Explain.

NO this is because electromagnets can only attract magnetic material. Plastic bag is a non- magnetic material and will not be attracted by an electromagnet.

2. 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.

No, the electrician cannot to replace the fuse in the house by a piece or wire. This is because every wire cannot be used as a fuse filament. A Fuse filament must have a low melting

point such that it could melt and break in response of large amount of current. Most of the wires have high melting points.

3. Zubeda made an electric circuit using a cell holder shown in figure given below, 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.

One of the reasons may be that the rubber band used in the cell holder may not be tight enough to keep the two cells in contact with each other. If the cells are not in proper contact with each other , then the circuit will not be complete and current will not flow through the circuit. Hence, the bulb will not glow. The other reason may be that the two cells are not connected properly. The negative terminal of one cell must be connected to the positive terminal of the other cell.

4. Why is air not filled in electric bulbs?

Air is not filled in electric bulbs because on lighting, the filament of the bulb becomes hot and this heat will result in burning in presence of air.

Value Based Question

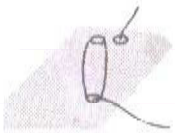
1. One day sohan went to his friend's He was surprised to see that most of the electrical appliances at his house were functional. For example tube light and fan in all rooms, two TV's, Computer light of toilet and kitchen were switched on sohan told his friend that this is not the way to use electricity.

Now the questions arises whether this habit of consuming electrical energy is acceptable or not. Why?

No, it is not acceptable. it will affect the economical condition of family as well as the nation because mostly non-renewable sources of energy is used to generate large amount of electricity. We should conserve the energy.

Skill Based Questions

1. Draw symbols for various electric circuit components.

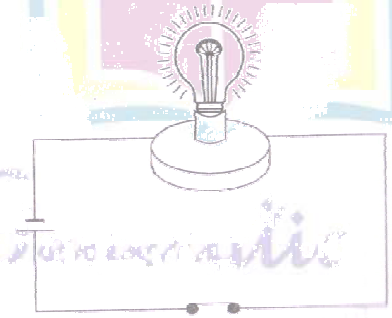
S. No.	Electric Component	Symbol
1.	Electric cell 	
2.	Electric bulb 	
3.	Switch in 'ON' position 	
4.	Switch in 'OFF' position 	
5.	Battery 	
6.	Wire 	

2. Draw diagrams of a

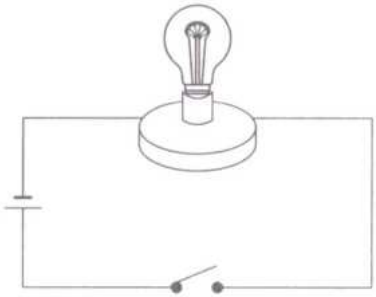
i) Closed circuit

(ii)Open circuit in which circuit the bulb glows?

(i) Closed circuit

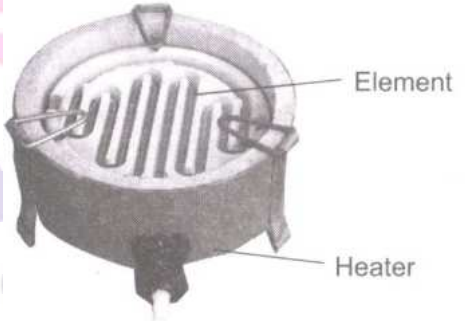


(ii) Open circuit



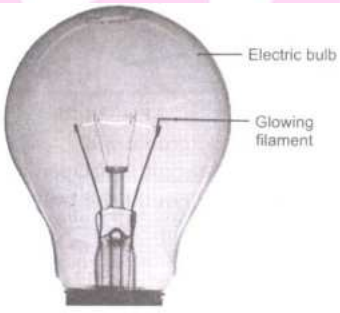
The bulb glows on when the circuit is closed or the sky is switched ON

3. Draw a diagram of an electric heater and label the element in it.



An electric heater

4. Draw a diagram of a glowing bulb and the glowing filament of it.



Glowing filament of an electric bulb

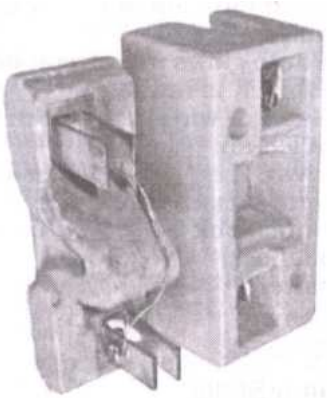
5. (i) How many types of fuses are there?

(ii) Draw diagrams of various types of fuses

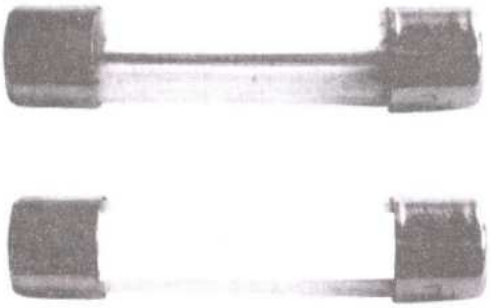
(iii) Why are they called safety devices?

(i) There are two types of fuses.

(ii) Various types of fuses are shown below.



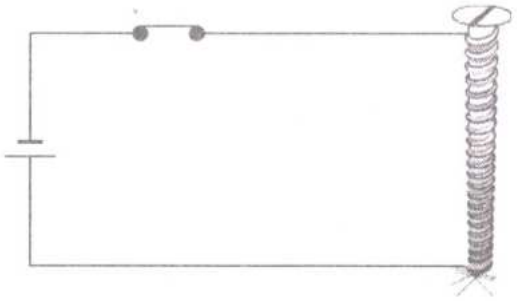
(a) Fuse used in buildings



(b) Fuses used in electrical appliances

(iii) A fuse is a safety device because it prevents damages to electrical circuits and possible fires by breaking the circuit.

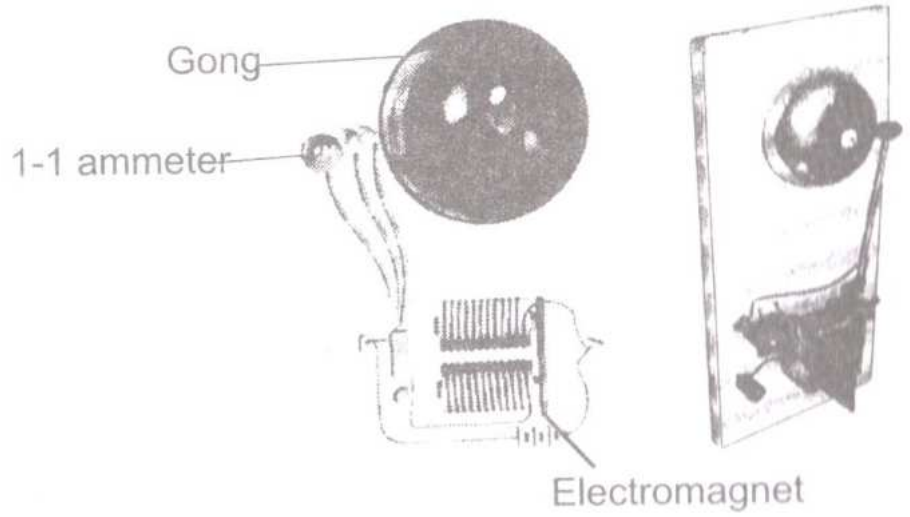
6. Draw diagram of electromagnet on which effect of electricity does it work?



An electromagnet

The electromagnet worked on the basis of magnetic effect of electricity

7. Observe the following figure and identify it. On which principle does it work



This diagram is of an electric bell

An electric bell works on the principle of magnetic effect of electricity.