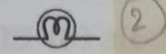
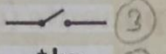
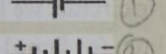
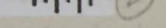


CHAPTER – 7 ELECTRICITY AND MAGNETISM

[EXERCISE SOLUTIONS]

Test Your Understanding [Page No. 132]

Match the following.

Column A	Column B
1. Cell	a.  2
2. Bulb	b.  3
3. Switch	c.  1
4. Battery	d.  2

Test Your Understanding [Page No. 135]

The electric cell is a common source of electric current to run a number of devices such as torches, radios, TV remotes, cassette players, electric clocks in our everyday life.

A single electric cell gives 1.5 volts of electricity. Many devices do not work properly with just one cell because they require higher voltage (than 1.5 volts) for their working. The higher voltage can be obtained by combining a number of cells in series. When the positive terminal of one cell is joined with the negative terminal of the other cell, then the cells are said to be joined in series.

A group of cells joined in series is called a battery.

We can now say that many devices need a battery (of cells) for their working. A battery of two cells gives $1.5 \times 2 = 3.0$ volts.

Find out the required voltage for the radio given in the picture.

Answer : Here in the given radio 4 cells are used.

1 cell carry = 1.5V

4 cells will carry = 1.5×4
= 6.0V

So the required voltage for radio = 6V

Think & Answer [Page No. 136]

Electrical wires at home are covered with plastic while wires connected to electric poles are bare though they carry a much larger amount of current. Why is it so?

Answer : At home wires are operated at low voltage and therefore can be covered by

plastic, as plastic being an insulator protect the cables from overvoltage conditions. But wires at electric poles are operated at high voltage level which plastic conductors cannot withhold so, they are not covered by plastic.

EXERCISES

[OBJECTIVE TYPE QUESTIONS]

A. Choose the correct option :

1. When similar poles of two magnets are brought near, they will show :

- (a) attraction (b) repulsion
(c) no effect (d) none of these

Answer : (b) repulsion

2. The device that works on the magnetic effect of electric current is :

- (a) electric bulb (b) electric bell
(c) electric kettle (d) all of these

Answer : (b) electric bell

3. Which of the following is not a part of an electric bell?

- (a) Gong (b) Hammer
(c) Soft iron bar (d) Heating element

Answer : (d) Heating element

4. The flow of electrons (electric charge) is known as :

- (a) electric current (b) electric potential
(c) electric field (d) none of these

Answer : (a) electric current

5.is the flow of electric charges passing per unit time.

- (a) Light (b) Wind
(c) Electric current (d) None of above

Answer : (c) Electric current

6. Electric cell is a device which converts :

- (a) chemical energy into electric energy
(b) electrical energy into chemical energy
(c) both are correct
(d) none are correct

Answer : (a) chemical energy into electric energy

7. Metal cap of dry cell is :
(a) positive terminal (b) negative terminal
(c) neutral terminal (d) none of these
Answer : (a) positive terminal

8. All good conductors have high :
(a) insulation (b) resistance
(c) conductance (d) all of these
Answer : (c) conductance

9. Electric current can flow through :
(a) plastic (b) rubber
(c) wood (d) metal
Answer : (d) metal

10. Which metal is mainly used in electrical wiring ?
(a) Silver (b) Iron
(c) Copper (d) None of the above
Answer : (c) copper

B. Fill in the blanks :

1. Magnetic poles always exist in.....
Answer : pairs

2.a sure test of magnetism.
Answer : Repulsion

3. The SI unit of electric current is.....
Answer : ampere

4. When a magnetic compass is brought near a current carrying wire it gets.....
Answer : deflected

5. An electric bell works on the.....effect of current.
Answer : magnetic

6. In a closed electric circuit, current always flow from.....terminal to.....terminal.
Answer : positive, negative

7. An electric current is because of the motion of.....
Answer : charge

8. There are multiple paths in a.....circuit.
Answer : parallel

9.is the necessary component of an electric circuit.
Answer : A cell (or battery)

10. A single electric cell gives.....volts of electricity.
Answer : 1.5

C. Write T for true and F for false statements :

1. The magnetic strength is minimum at the poles of a magnet.

Answer : False

2. Attraction is the sure test of magnetism.

Answer : False

3. The strength of an electromagnet highly depends on the magnitude of electric current passing through it.

Answer : True

4. Copper is used to make electromagnets.

Answer : False

5. Electromagnet is used in loudspeakers.

Answer : True

6. An electric cell is a device which produces a large amount of electricity.

Answer : False

7. In a dry cell, carbon rod is with a brass cap and acts as a positive electrode.

Answer : True

8. If a material has more number of free electrons, it acts as a bad conductor of electricity.

Answer : False

9. In series circuit, each device is connected in such a way that there is only one path through which electric current can flow.

Answer : True

10. Parallel circuits are economical since they require less wire.

Answer : False

D. Name the following :

1. Materials that do not allow electric current to pass through them.

Answer : Insulators.

2. An electric component used to open and close an electric circuit.

Answer : Switch

3. A material used to make the filament of an electric bulb.

Answer : Tungsten

4. These are used to separate iron from garbage dump.

Answer : Magnets

5. The cells which can be charged.

Answer : Secondary cells

6. The negatively charged particles present outside the nucleus.'

Answer : Electrons

7. An alloy used to make resistors.

Answer : Manganin

F. Odd one out.

1. Rubber, plastic, graphite, glass

Answer : graphite

2. Silver, nichrome, manganin, constantan

Answer : silver

3. Aluminium, iron, mica, copper

Answer : mica

SUBJECTIVE TYPES QUESTIONS

F. Answer the following questions in short.

1. What is electromagnetism?

Answer : The branch of physics that deals with the magnetic effect of electric current.

2. Write two uses of electromagnets.

Answer : (i) Electromagnets are used for lifting heavy loads like big iron machines, steel girders and scrap iron objects, for loading and unloading purposes.

(ii) Electromagnets are used for separation of iron and steel objects from a heap of metal scrap.

3. What are the advantages of electromagnets over permanent magnets?

Answer : (i) Electromagnets can be easily magnetised or demagnetised by turning on or turning off the electric current, respectively.

(ii) We can make stronger electromagnets than any other permanent magnet.

4. Define electricity.

Answer : Electricity is a form of energy that exists as charges in all atoms. It is used for many purposes like heating and cooling our rooms, cooking food, running refrigerators, etc.

5. Write the relation between electric current and electric charge.

Answer : Mathematical relation between electric current and electric charge is :

Current (I) = Charge (Q)/Time (t)

1 A = 1 Coulomb/1 sec

6. Why should we not use the electricity from power points?

Answer : According to the Energy Saving Trust, any switched on charger that is plugged in **will still use electricity**, regardless of whether the device is attached or **not**. The amount of **electricity** produced from this only costs a few pence, but it **will** shorten the shelf life of the charger.

7. What are resistors?

Answer : Those substances which have comparatively high electrical resistance, are called resistors.

8. Write the symbols for the following :

a. Resistors

b. Cell

c. Voltmeter

d. Bulb

Answer :

9. What is battery?

Answer : A combination of cells of the same kind.

10. Name five good and bad conductors of electricity each.

Answer : Good conductors of Electricity :

Silver, copper, aluminium, iron, steel, etc.

Bad Conductors of Electricity : Rubber, plastics (like polythene, PVC and bakelite), ceramics, porcelain (china, etc.), wood, etc.

G. Answer the following questions in brief.

1. Explain the laws of magnetism.

Answer : (i) A freely suspended bar magnet always comes to rest along the north-south direction.

Here, the end point of the magnet that points towards the north is called the north pole of the magnet and the end that points towards the south is called its south pole.

(ii) Like poles repel and unlike poles attract. If we bring the north pole of a magnet near the north pole of a freely suspended magnet, the poles of the magnets repel. But if we bring the north pole of a magnet near the south pole of a freely suspended magnet, the poles of the magnets attract. So, 'like' poles repel and 'unlike' poles of magnets attract.

(iii) Poles exist in pairs.

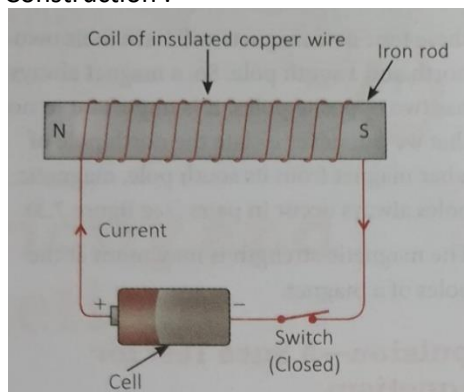
If we take a bar magnet and cut it into two pieces. The two new magnets will have their own north and south poles.

(iv) The magnetic strength is maximum at the poles of a magnet.

2. What is an electromagnet? Explain in your own words, how to make an electromagnet. Draw a labelled diagram to show the circuit of the electromagnet.

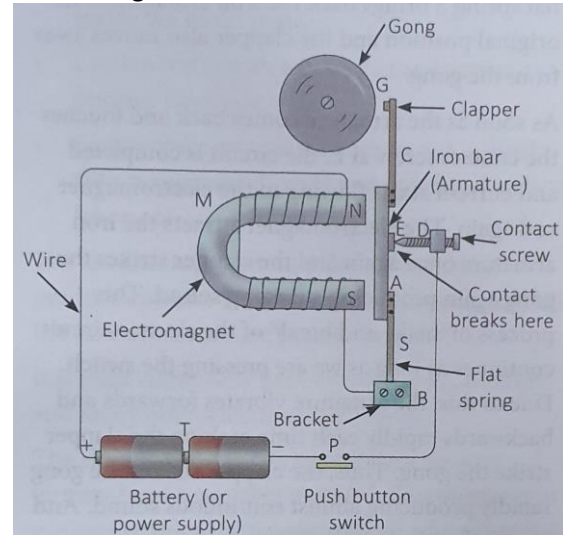
Answer : Electromagnet : A magnet formed due to the passage of electric current and retains its magnetism as long as the current passes through it, is known as an electromagnet.

Construction :



3. What type of magnet is used in an electric bell? Draw a labelled diagram of an electric bell?

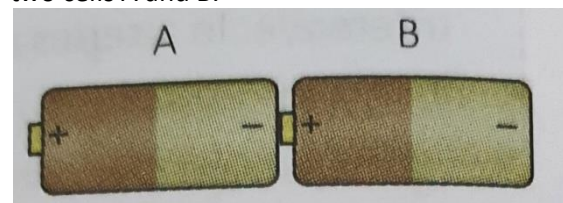
Answer : The electric bell works on the magnetic effect of current. It has an electromagnet in it.



4. What is meant by a battery? How will you arrange two cells to make a battery? Explain with the help of a diagram. Mark the terminals (+ and -) of both the cells.

Answer : Battery : A combination of cells of the same kind.

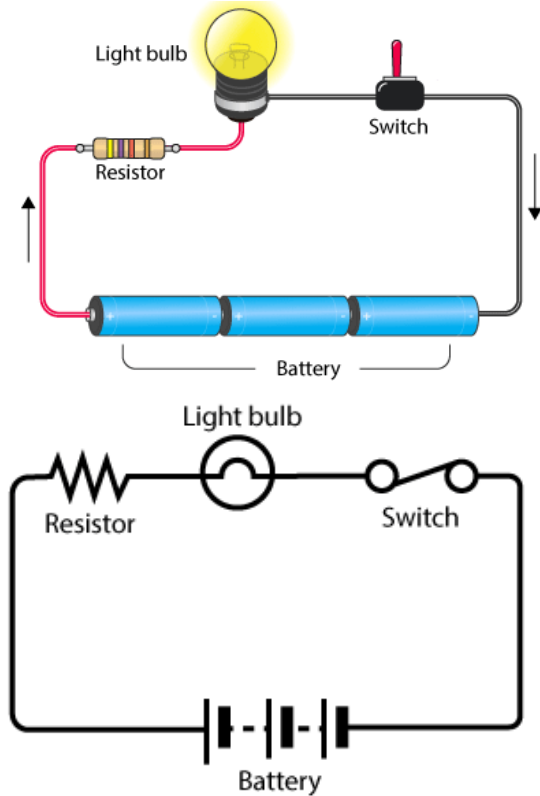
When joining two (or more) cells to make a battery, the positive terminal of one cell is always kept in contact with the negative terminal of the other cell. We know that the positive terminal of a cell is the brass cap and the negative terminal is the bottom of the zinc container. So, the cells are joined in such a way that the brass cap of one cell touches the zinc bottom of the other cell. As you can see in the figure, it shows a battery made of two cells A and B.



The positive terminal (brass cap) of cell B has been kept in contact with the negative terminal (bottom of zinc container) of cell A. The positive terminal of cell A and the negative terminal of cell B are free to draw current from this combination (or battery) of two cells.

5. What is an electric circuit? Explain with the help of a diagram.

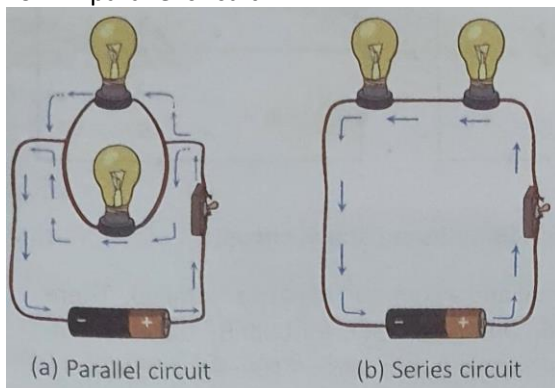
Answer : **Electric Circuit :** A continuous conducting path (consisting of wires, bulb, switch, et c.) between the two terminals of a cell or battery along which an electric current flows, is called a circuit.



6. Explain series and parallel circuits with diagrams.

Answer : **Series Circuit :** In series circuit, each device is connected in such a way that there is only one path through which electric current can flow.

Parallel Circuit : In a parallel circuit, all the electrical appliances are connected by means of parallel connections. There are multiple paths, through which the electric current can flow in parallel circuit.



7. Explain the structure of dry cell with the help of neat and clean diagram.

Answer : **A dry cell consists of :**

(i) A zinc container that acts like a negative terminal. It is placed inside a painted tin container.

(ii) Zinc container is filled with a moist paste of ammonium chloride and Plaster of Paris. It works as an electrolyte.

(iii) A muslin bag with a carbon rod is placed inside the moist paste.

(iv) Carbon rod is with a brass cap and acts as a positive electrode.

(v) Empty space around the carbon rod is filled with manganese dioxide and powdered carbon (charcoal).

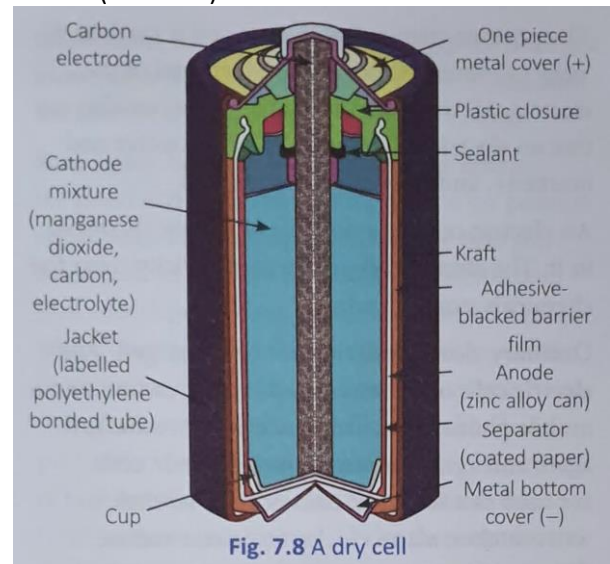


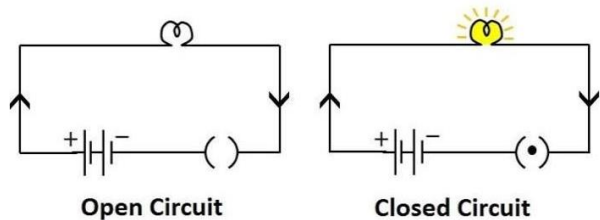
Fig. 7.8 A dry cell

8. Write an experiment to test whether a material is a conductor or an insulator.

Answer : Touch the open ends of the two wires to each other to form a circuit and **test** the bulb. Touch the two open ends of the wire to each **material** you are **testing**, one at a time. **If** the bulb lights up, it is a good **conductor**. **If** it doesn't, it is a good **insulator**.

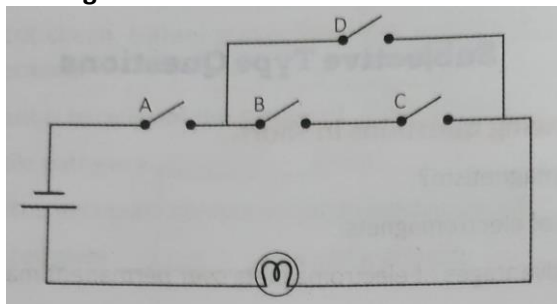
9. Differentiate between open and closed circuit.

Answer : A **circuit** is considered to be **closed** when electricity flows from an energy source to the desired endpoint (and back to the source) of the **circuit**. In other words, a **closed circuit** has a complete path for current to flow, whereas an **open circuit** doesn't, which means that it's not functional.



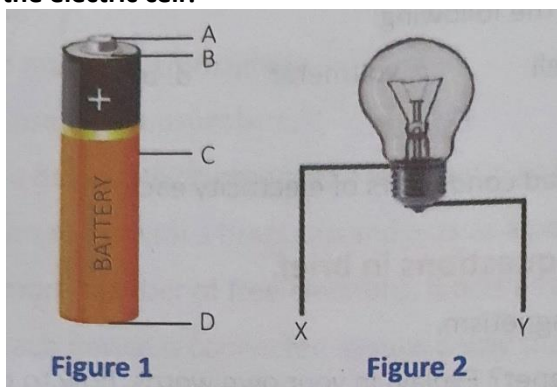
PICTURE-BASED QUESTIONS

A. How many minimum number of switches are to be closed for a bulb to glow in the circuit given below?



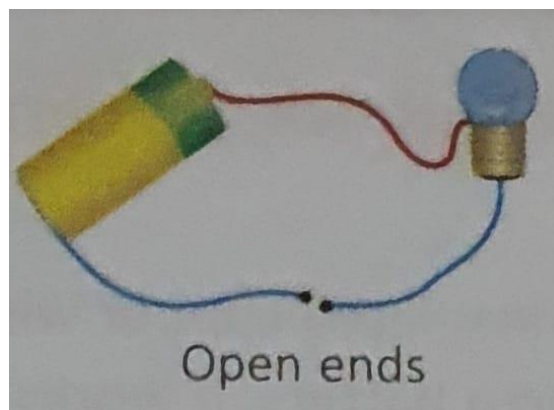
Answer : Two

B. Various parts on the outer surface of an electric cell are labelled as A, B, C and D respectively in figure 1. In figure 2, an incomplete circuit is shown. X and Y are the free ends of this circuit. To make the bulb glow, free ends X and Y of the circuit should be respectively connected to which part of the electric cell?



Answer : Free end 'X' is connected to 'D' and free end 'Y' is connected to 'A'.

C. An open circuit is shown in the figure given below.



Which of the following objects should be inserted in the gap to make the bulb glow?

- (a) Aluminium foil
- (b) Cork
- (c) Key
- (d) Rubber band

Answer : (c) Key

APPLICATION-BASED QUESTIONS

1. Which material is used for making for an electric circuit? Why is it necessary to coat the wires with an insulating material?

Answer : Copper and aluminium.
To prevent accidental contact with other conductors.

2. Silver is one of the best conductors of electricity, even then, copper wires are used in electric circuit. Explain.

Answer : Because, silver is 10 times more expensive than copper. That's why we use copper wires instead of silver wires in electric circuit.

3. Electrical gadgets stop working when the switch is turned OFF. Why?

Answer : Because circuit breaks and electricity stops flowing.

4. Will the bulb glow if both the terminals of a bulb are connected to the positive terminal of a cell?

Answer : No.

5. Why do metals conduct charges better than wood?

Answer : Because, metals have large number of free electrons. That's why metal conducts charges better than wood.