Current Electricity and Magnetism

EXERCISE [PAGE 27]

Exercise | Q 1.1 | Page 27

Fill in the blanks.

Water in the waterfall flows from a higher level to the lower level because of _____.

Solution: Water in the waterfall flows from a higher level to the lower level because of **potential differences**.

Exercise | Q 1.2 | Page 27

Fill in the blanks.

In an electric circuit, electron flow a from of point of _____ potential to the point of _____ potential.

Solution: In an electric circuit, electron flow a from of point of **higher** potential to the point of **lower** potential.

Exercise | Q 1.3 | Page 27

Fill in the blank.

The differences between the electrostatic potential of the positive end the negative end of an electric cell is the _____ of the cell.

Solution: The differences between the electrostatic potential of the positive end the negative end of an electric cell is the **potential** of the cell.

Exercise | Q 1.4 | Page 27

Fill in the blank.

Three electric cells of potential difference 1.5 V each have been connected as a battery. The potential differences of the battery will be _____ V.

Solution: Three electric cells of potential difference 1.5 V each have been connected as a battery. The potential differences of the battery will be **1.5 + 1.5 + 1.5 = 4.5** V.

Exercise | Q 1.5 | Page 27

Fill in the blank.

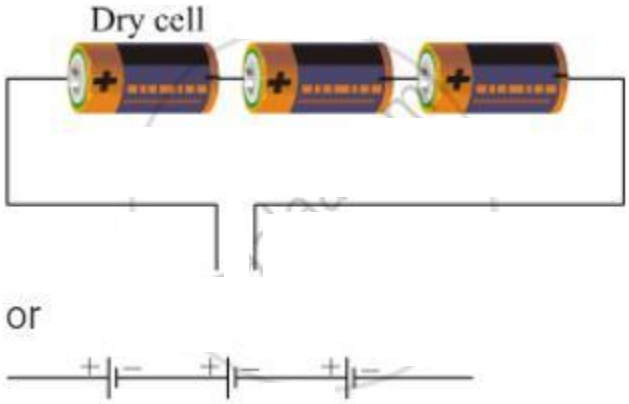
An electric current flowing in a wire creates _____ around the wire.

Solution: An electric current flowing in a wire creates **magnetic field** around the wire.

Exercise | Q 2 | Page 27

A battery is to be formed by joining 3 dry cells with connecting wires. Show how will you connect the wires by drawing a diagram.

Solution:



Exercise | Q 3 | Page 27

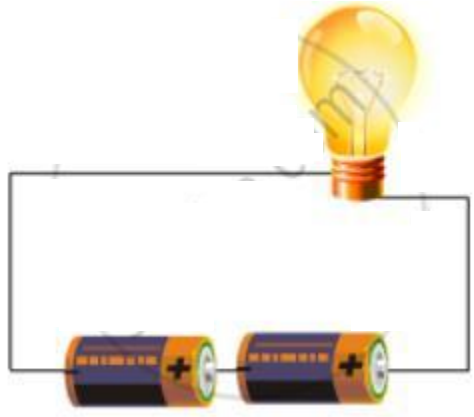
In an electric circuit, a battery and a bulb have been connected and the battery consists of two cells of equal potential difference. If the bulb is not glowing, then which tests will you perform in order to find out the reason for the bulb not glowing?

Solution: The following test should be performed to find the reason why bulb is not glowing:

1. Check how the terminals of the batteries are connected to each other: Ensure that the positive terminal of one battery is connected to negative terminal of other battery. If the batteries are connected in this this way and even then the bulb does not glow, go for the next test given below.

2. Check for the broken wires in the circuit: Ensure that the wires used for connecting the various electrical components are nor broken in between i.e. ensure that the circuit is closed. Even after ensuring that the wires are not broken in between, the bulb does not glow, move to the next test.

3. Check how the connecting wires are connected to the bulb: Ensure that the bulb is connected to the batteries using the connecting wires as shown below. Even now, if the bulb does not glow, replace the bulb or the batteries with a new one.



Exercise | Q 4 | Page 27

Electric cells having 2 V potential difference each have been connected in the form of a battery. What will be the total potential difference of the battery in both cases ?

(i)

(ii)

Solution: (i) Total potential difference = 2 + 2 + 2 = 6 V

(ii) Total potential difference = 2 + 2 + 2 + 2 = 8 V

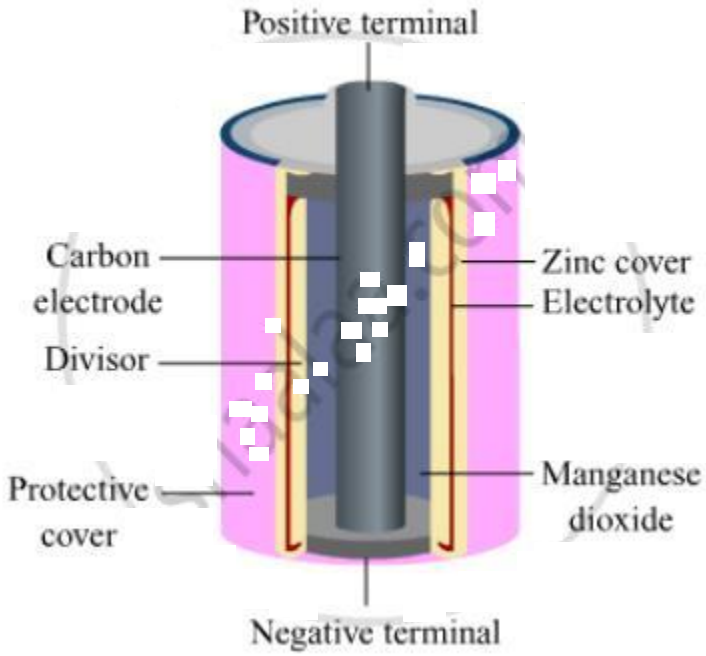
Exercise | Q 5 | Page 27

Describe the construction, working and usefulness of a dry cell, with the help of a diagram.

Solution: Construction of dry cell
The dry cell consists of following components:
Outer metal covering: The metal covering is made up of zinc metal and is whitish in appearance. It acts as a negative terminal of the cell.
Electrolyte: Inside the Zinc metal, there is the electrolyte filled between two layers.

Electrolyte is a wet pulp of Zinc chloride ($ZnCl_2$) and Ammonium chloride (NH_4Cl). It is the charge carrier of electricity as it contains negatively charged and positively charged ions.

Metal rod: There is a graphite rod at the centre of the cell. It is surrounded by paste of Manganese dioxide (MnO_2). It acts as the positive terminal of the cell.



Working of dry cell: Chemical reactions take place between the electrolyte, zinc container and graphide rod. Because of this, electric charge is produced on the two terminals of the cell and electric current flows in the circuit.

Usefulness of dry cell: They are handy and portable. The life of dry cell is longer than cells using liquid electrolyte. Dry cells can be use in torch, T.V. or A.C remote controls, toys, etc.

Exercise | Q 6 | Page 27

Describe the construction and working of an electric bell with the help of a diagram.

Solution: Construction of an electric bell

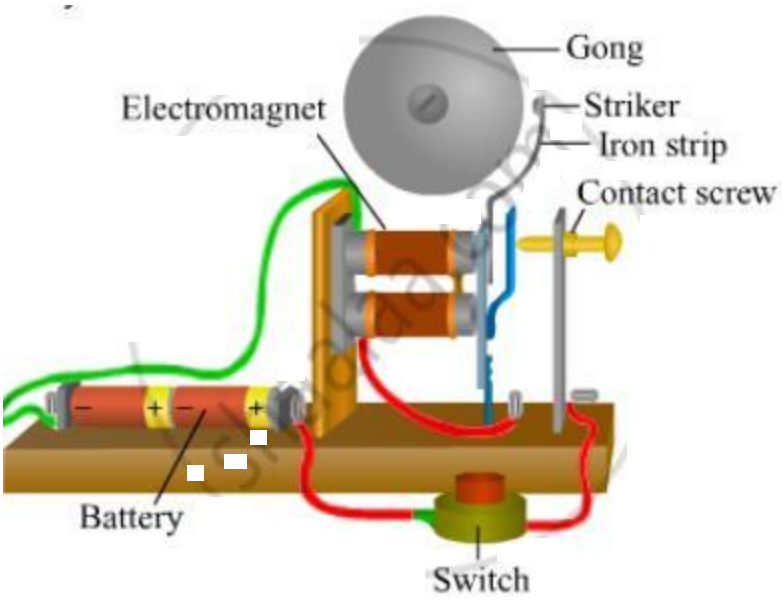
Following are the components of electric bell:

1. Electromagnet: A copper wire is wound around an iron piece which acts a magnet when current flows through it.

2. Striker in touch with contact screw through an iron strip

3. A metal gong

4. A key or a switch



Working of an electric bell

When the switch is 'ON' and the screw is in contact with the iron strip, then electric current flows through the copper wire which gets magnetised because of electromagnetism. This magnetised copper wire (or the electromagnet) attracts the iron strip towards it, letting the striker hit the gong and thus sound is produced. As soon as the striker hits the gong, the screw loses its contact with the iron strip and therefore, current stops in the circuit. At this point, the electromagnet loses its magnetism and the iron strip moves back and comes in contact with the contact screw. The electric current is then restored in the circuit and again the striker hits the gong by the above process. This action repeats itself and the bell rings.