4. Current Electricity and Magnetism

Q 1) Write proper words from the following group of words in the blanks.

(Magnetism, 4.5V. 3.0V, gravitational attraction, Potential difference, potential, higher, lower , 0V)

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

Ans. gravitational attraction

b. In an electric circuit, electrons flow a form of point of ..... Potential to the point of ..... potential.

Ans. lower, higher potential

c. The difference between the electrostatic potential of the positive end of an electric cell is the .....

Ans. potential difference

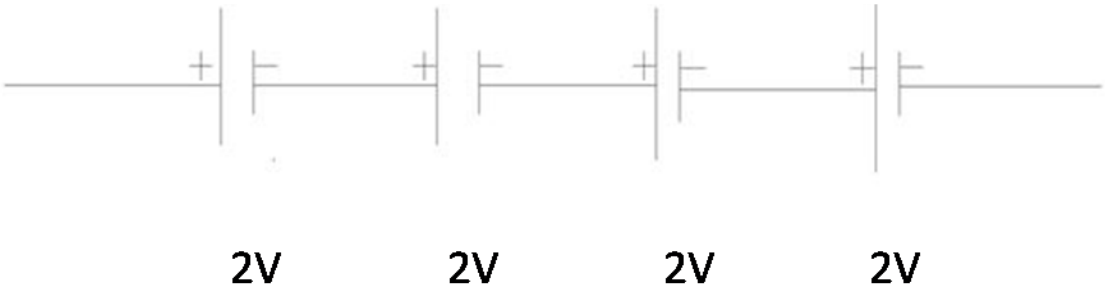
d. Three electric cells of potential difference 1.5 V each have been connected as a battery the potential difference of the battery will be..... V.

Ans. 4.5

e. An electric current flowing in a wire creates ..... Around the wire.

Ans. magnetism

Q 2) A battery is to be formed by joining 3 dry cells them with connecting wires. Show how you will connect the wires by drawing a diagram.



Q 3) 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?

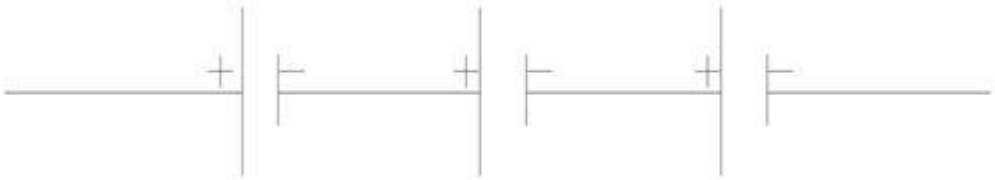
Ans. i) For a circuit to work, it should be closed. If the bulb is not glowing, then we should check whether circuit is not glowing, then we should check whether circuit is closed or open.

ii) If bulb is connected to positive terminal of 1 battery and negative terminal of another, then there is a closed path for flow of electrons or current, Electrons always flow from negative to positive terminal of battery through closed circuit.

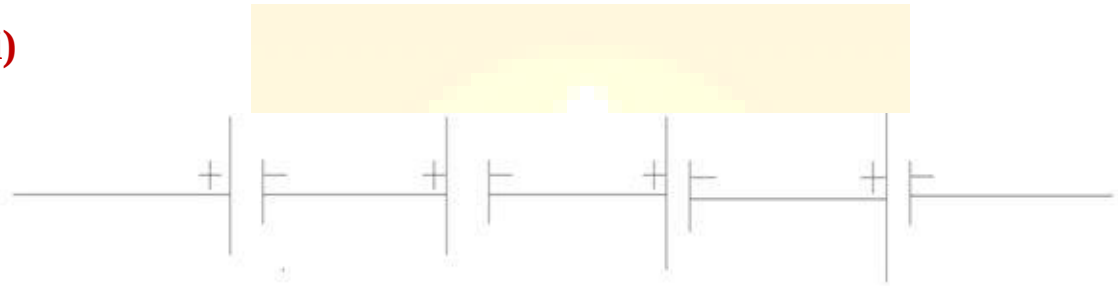
iii) The connections in between the cells is also need to be checked. The positive terminal of one cell should be connected to the –ve of the other.

Q 4) Electric cells having 2V potential difference each have been connected in the form of battery. What will be the total potential difference of the battery in both cases?

i)



ii)



Ans.

i)

In this case, there cells are connected and each cell has 2V potential difference, hence the total potential difference will be.

Total potential difference = Sum of all the Potential

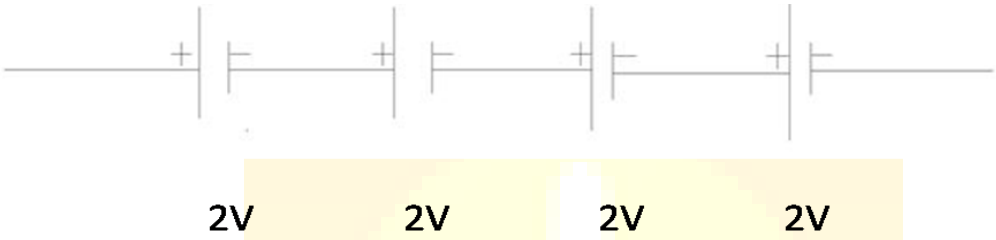
Difference of each cell

∴Total potential difference = 2V + 2V+ 2V

∴ Total potential difference = 6V

Therefore, total potential difference is 6V.

ii)



In this case, four cells are connected and each cell has 2V potential difference. Hence, the total potential difference.

Total potential difference = Sum of all the Potential Difference of each cell

∴Total potential difference = 2V + 2V+ 2V+2V

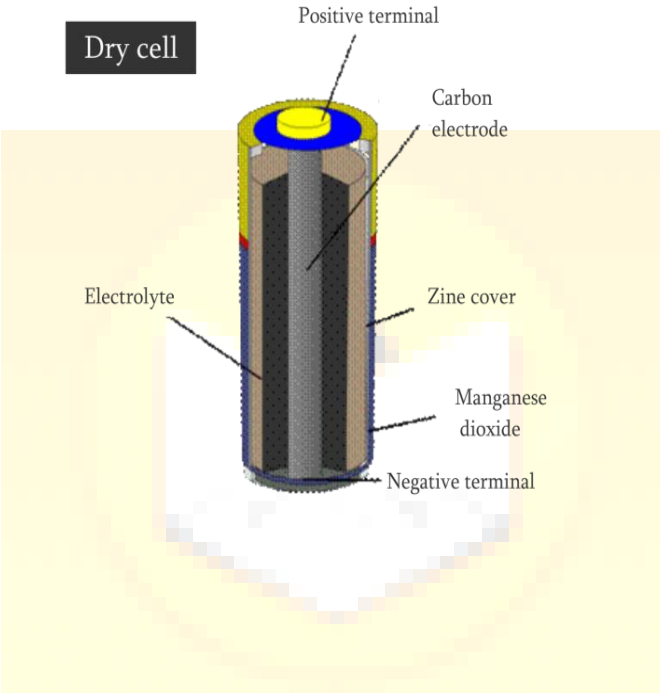
∴ Total potential difference = 8V

Therefore, total potential difference is 8V

Q 5) Describe the construction, working and usefulness of a dry Cell, with the help of a dry Cell, with the help of a diagram.

Ans.

Dry Cell



Construction:

1) A dry cell consists of a thick zinc (Zn) case, which acts as a negative pole of the cell.

2) Inside the zinc case in the centre, there is carbon rod which is the positive pole of the cell.

3) Around carbon rod, there is a mixture of finely powdered manganese dioxide (MnO_2) and graphite held in a bag of thin material.

4) The space between this bag and the outer cylindrical zinc cover is filled with a moist past of zinc chloride ($ZnCl_2$) and ammonium chloride (NH_4Cl).

5) Then, the carbon rod is filled with a metal cap and cell is sealed.

Working:

1) Due to the chemical reactions of all chemicals present in dry cell, electrical charge is produced on the two terminals (graphite rod and zinc layer) and an electric current flow in the circuit.

2) Because of the wet pulp used in this cell, the chemical reaction proceeds very slowly. Hence, a large electric current cannot be obtained from this.

3) Compared to the electric cells using liquids, the life of dry cells is longer.

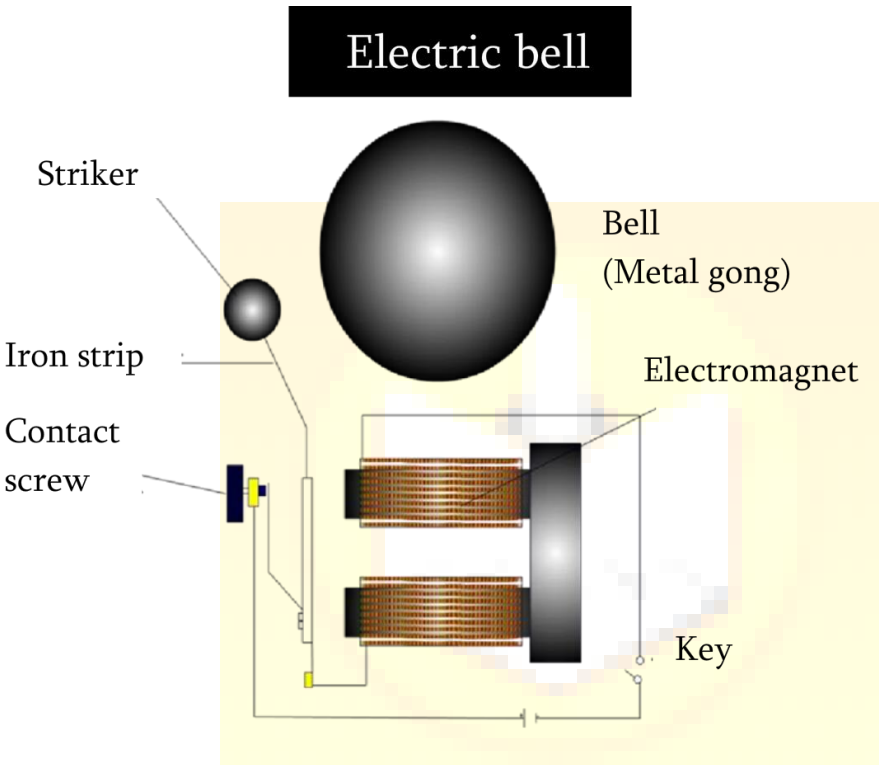
Uses:

1) Dry cells are very convenient to use as these can be held in any direction with respect to ground.

2) It is used in devices like electric toys, torches, transistor radios, any mobile instruments.

Q 6) describes the construction and working of an electric bell with the help of a diagram.

Ans.



Construction:

1) An Electric bell consists of an insulated copper wire, which is coiled around the horse shoe shaped iron core.

2) One end of coil of wire is connected to one end of an electric cell.

3) When electric current flows through the coil, it behaves like a magnet.

4) A flexible iron strip is placed in from of this magnet.

5) A metal striker is attached to this strip. This striker can strike a metal gong.

6) The other pole of the cell is connected to a contact screw through a switch.

7) The flexible metal strip is in contact with the screw.

Working:

1) When we press the switch, circuit is completed. When screw is in contact with strip electric current flows through the coil making the core an electromagnet.

2) At once, it attracts the flexible iron strip and the striker hits the gong and sound is produced.

3) However, in this position the contact of strip with the screw breaks and current stops.

4) At this time, the coil loses its magnetism and flexible strip moves back and makes contact with the screw.

5) This causes the current to flow again and again and striker hits the gong.

6) This make and break of current keeps the bell ringing till the switch is pressed.