# 4. Current Electricity and Magnetism

## Practice Questions

### Q 1) Write Short notes on the following.

### 1. Potential difference

**Ans: The difference in the potential between two ends of the conductor is called as potential difference.**

**If a hot substance is kept in contact with a cold substance, the heat flows from hot substance to the cold substance. Air and water flows always from high capacity to low capacity means from the top level to the lower level. Based on this property, we understand that the flow of any substance is from high capacity to low capacity. Accordingly, the electricity from the conductor must be flowing from high capacity to low capacity means the electricity can be transmitted/ transferred if the power capacity in an electrode of an electric cell is different. Electricity flows from positive end to the negative end and this is the significant direction of electric current. Potential difference is measured with the help of voltmeter. The SI unit of potential difference is volt (V).**

### 2. Electrostatic Potential

**Ans: Water or a liquid flow from a higher level to a lower level. Heat always flows from a body at higher temperature to a body at lower temperature. Similarly, there is a tendency of the positive charge to flow from a point of higher electric level to a point of lower electric level. This electric level deciding the**

direction of flow of electric charges is called electrostatic potential.

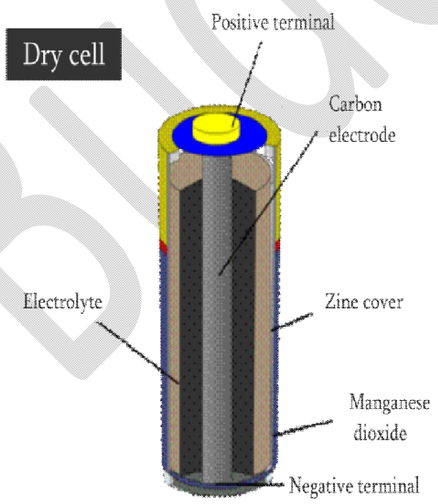
## 3. Electric cell

Ans: A source is required to produce a uniform flow of charge in a circuit. Such a general device is an electric cell. These are used in a variety of different machines from wrist watches to submarines.

The main function of electric cell – to maintain a constant potential difference between its two terminals. The electric cells work on the electric charges to maintain a constant potential difference.

## 4. Dry cell

Ans: Diagram of Dry cell




In dry cell, zinc metal acts as negative terminal while carbon electrode acts as positive terminal.

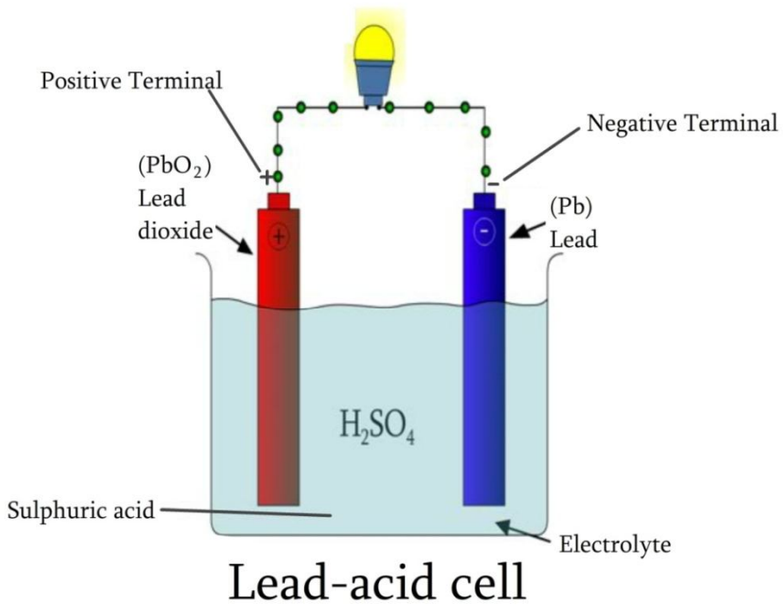
**The substances such as Graphite – Manganese dioxide ($MnO_2$) mixture, Ammonium chloride, Zinc chloride and wood froth are used in this.**

**The solution is not used in this cell. So it is also known as aneroid cell.**

**Use: The dry cells are used in radio sets, wall clocks, camera and torches.**

**Q 2) Explain construction and working of Lead-Acid cell with the help of the diagram.**

**Ans: Diagram of Lead-acid cell**



Lead-acid cell

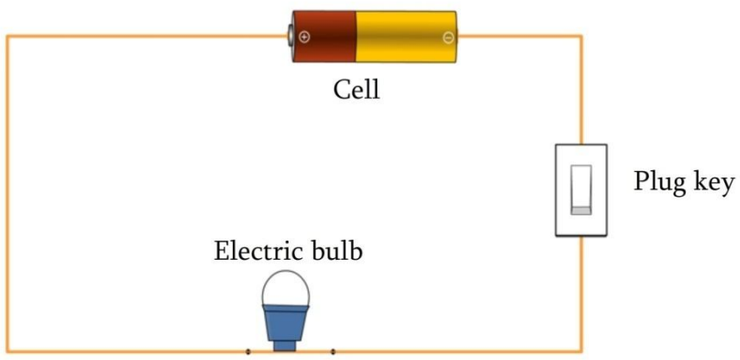
**The lead-acid cell (pb) contains a lead electrode and a lead oxide electrode ($pbo_2$) and both are dipped in dilute sulphuric acid. $pbO_2$ carries a positive charge, while the Pb electrode carries a negative charge. The potential difference between these two is nearly 2V. Because of the chemical reaction between the substances in the cell, electrical charge is produced on both the electrodes.**

**This kind of electric cells have capacity to deliver large electric current.**

**Use: Lead-acid cells are used in cars, trucks, motorcycles and uninterrupted power supplies (UPS).**

**Q 3) Explain the construction of the electric circuit with the help of diagram.**

**Ans: Diagram of Electric circuit**

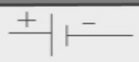
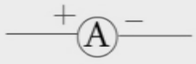
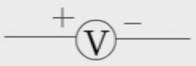



Simple electric circut

**When a cell holder, an electric bulb and a plug key are connected by connecting wires, as shown in figure and dry cell is fitted in the holder, then the bulb lights up by closing the plug key. This means that a current flows through the circuit and bulb lighten up. On the removal of the cell, the electric current flowing through the circuit stops as indicated by the bulb which ceases to glow. This type of connection of electrical components is called as electric circuit.**

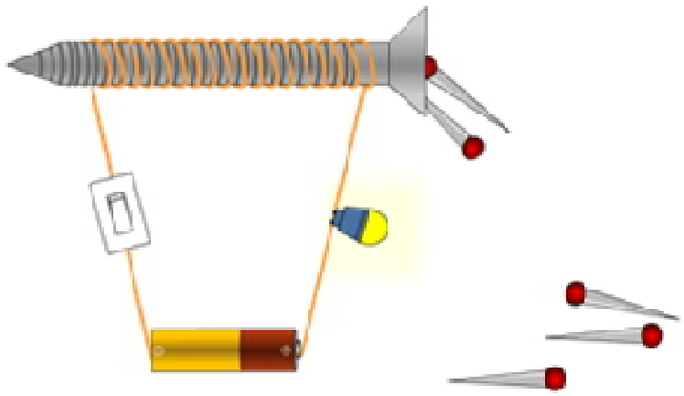
**The different signs are used for electrical equipments in the electrical circuit.**

| Sr. no. | Electrical equipment | Sign | Uses |
|---|---|---|---|
| 1 | Electric cell | | To create potential difference |
| 2 | Battery | | To create more potential difference |
| 3 | Ammeter | | To measure electric current |
| 4 | Voltmeter | | To measure potential difference |
| 5 | Galvanometer | | To check whether electric current is there or not |

| Sr.no | Electric Equipment | Sign | Uses |
|---|---|---|---|
| 1 | Electric cell |  | To create potential difference |
| 2 | Battery |  | To create more potential difference |
| 3 | Ammeter |  | To measure electric current |
| 4 | Voltmeter |  | To measure potential difference |
| 5 | Galvanometer |  | To check whether electric current is there or not |

**Q 4) Show how the electromagnet is formed with the help of diagram.**

**Ans: Diagram**



**Take one meter long flexible copper wire having resistive coating and wind it tightly on a long iron screw. Connect the two ends of the wire in a circuit as in the figure. Also connect an electric cell and a plug key in the circuit. Keep 2-4 iron pins/small nails near the screw. Now start the current in the circuit by plugging the key. You will notice that the pins/nails have stuck to the tip of the screw. As soon as the key is opened, the pins/nails falls down. In this way the electromagnet is formed.**

**Q 5) Write the information about the series connection of resistance.**

**Ans: 1) The electrical current flowing through each part of the unit is equal if resistance is connected in series in electric circuit.2) The total potential difference in a series connection is equal to the difference of potential difference between each**

resistance. 3) The resultant resistance of a series connection is equal to the sum of all resistances. 4) The resultant resistance of a series connection is more than the value of individual resistance. 5) The potential difference between each resistance is equivalent to that resistance that means more is resistance then potential difference is also large. 6) The series connection is used to increase the resistance in electric circuit. Ex. Fuse.

**Q 6) Write the properties of the magnet.**

Ans: 1) Attraction property of the magnet: the iron particles get attracted towards both the ends (poles) of the magnet. 2) Directional property: if the freely moving magnet is hanged anywhere on the earth, it remains still in the south-north direction.

3) Magnetic poles – The hanging magnet-

1) The pole which shows the north direction, is the North Pole (N) of the magnet.

2) The pole which shows the south direction, is the South Pole (S) of the magnet.

4) The interaction between the poles of the magnet:

a) There is repulsion between the like poles (N-N) or (S-S) of the magnet.

b) There is attraction between the unlike poles (N-S).

**Q 7) 1. Write the types of the conductors.**

Ans: There are four types of the conductors.

a) Good conductor b) Bad conductor/ insulator c) Semiconductor d) Superconductor

**1) Good conductor – The conductor which has very low resistance is called as a good conductor. Ex. Silver, gold, aluminium, copper, etc.**

**2) Bad conductor – The conductor which has very high resistance is called as a bad conductor. Ex. Rubber, wood, glass, paper, plastic, etc.**

**3) Semiconductor – The conductor which has high resistance than good conductor but low resistance than bad conductor is called as a semiconductor. Ex. Silicon, germanium, gallium, tin, various alloys and metal oxides, etc.**

**4) Superconductor – The substance whose resistance becomes very low if the temperature is decreased is called as superconductor.**

**2) Write the uses of the magnet.**

**Ans: 1) The magnet is used in compass to find/ indicate the direction. 2) The horseshoe magnet and bar magnet is used in the laboratory and in the electricity generator. 3) Magnetic needle is used in laboratory to indicate the direction. 4) Disc magnet is used in various electrical equipments. 5) This magnet is used in the T.V and cathode ray tube of the computer. 6) It is used in electric motor, generator and electric guitar.**

## Q 8) Write the reasons.

**1) The dry cell is convenient to use.**

**Ans: 1) Compared to the electric cells using liquids, the shelf life of dry cells is longer.**

**2) Dry cells can be held in any direction with respect to ground and can be used in mobile instruments, due to this reason dry cell is convenient to use.**

## Q 9) Write the answers in one sentence.

**1) What is current electricity?**

**Ans: If the free electron in the conductor comes in motion, the electric current is generated in the conductor by the flow of electric charge. The energy related to the electric charge in motion is called as current electricity.**

**2. Write the types of electrical energy.**

**Ans: The static electricity and current electricity are the types of electrical energy.**

**3. What is electric field?**

**Ans: The field around the electric charge is called the electric field.**

**4. What is the conductor?**

**Ans: The substance in which electric charge move easily from one end to another is called as a conductor.**

**5. What is meant by the resistance of a conductor?**

**Ans: The property of a conductor to oppose the flow of electric current is called as resistance.**

**6. Which equipments do not need continuous electric current?**

**Ans: Electric bell and telegraph are the equipments which do not need continuous electric current.**

**7. What is the critical temperature?**

**Ans: The specific low temperature at which the resistance of superconductor becomes zero is called as critical temperature.**

**8. By which method the electric conductor is charged?**

**Ans: The electric conductor is charged by three methods called friction, conduction and enforcement.**

**Q 9) Identify the correlation.**

**1. Electron: negatively charged particle: :Proton: _____.**

**Ans: positively charged particle**

**2. Dry cell: _____: : lead-acid: lead**

**Ans: Zinc**

**Q 10) Write whether the following statement is true or false.**

**1. Electric current is the scalar quantity.**

**Ans: True**

**2. Due to the electric cell, the constant potential difference between two terminals cannot be maintained.**

**Ans: False (Due to the electric cell, the constant potential difference between two terminals can be maintained.)**

**3. Germanium, graphite are semiconductors.**

**Ans: True**

**4. The electric current is measured in ampere with the help of ammeter.**

**Ans: True**

**Q 11) Define the following.**

**1. Electric charge**

**Ans: The product of flowing electric current from a conductor and required**

**time is called as an electric charge.**

**2. Ampere**

**Ans: When electric charge of 1 coulomb flows through a conductor in 1 second, it is said that electric current flowing through it is one ampere.**

**3. Electric circuit**

**Ans: The path of various electrical components connected by conductor/ connecting wires between both the ends of electric cell is called an electric circuit.**

## 4. Volt

**Ans: If 1 joule work is done while carrying electric charge of 1 coulomb through a conductor, it is said that the potential difference between two ends of a conductor is 1 volt.**