



# SHIKSHA CLASSES

Sub. : Science

Answer Paper

Marks : 20

Std. : VIII<sup>th</sup> - S.B.

4. Current Electricity and Magnetism

**Q.1(A) : Choose the correct alternative**

2

1) The Ni-Cd cell delivers a potential difference of \_\_\_\_\_.

Ans : b) 1.2 V

2) The working of an electric bell is based on \_\_\_\_\_.

Ans : c) the magnetic effect of electric current

**Q.1(B) : Solve any one of the following question**

1

1) What is the SI unit of electric current?

Ans : The SI unit of electric current is Ampere.

2) Why water in the waterfall flows from a higher level to the lower level?

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

3) Consider the relation between the items in the first pair and write the correlation for second pair:

Lead Acid cell: Potential difference 2V:: Ni-Cd cell:-----

Ans : Lead Acid cell: Potential difference 2V:: Ni-Cd cell: 1.2V

**Q.2(A) : Give reason (Any One)**

2

1) Dry cells are very convenient to use.

Ans : i) The electrolyte used in dry cell is relatively not so harmful to the environment.

ii) It is light and small in size and can be transported from one place to another.

iii) These can be held in any direction with respect to ground and can be used in mobile instruments.

2) Lead acid cells are used in cars, trucks.

Ans : Lead acid cells have a capacity to deliver large current therefore lead acid cells are used in cars, trucks.

**Q.2(B) : Solve any two of the following question.**

4

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

Ans :

**2) Explain the concept of electrostatic potential (electric potential).**

**Ans :** A liquid flows from a higher level to a lower level. Heat flows from a body at a higher temperature to a body at a lower temperature. Also when different parts of a body are at different temperatures, heat flows from the part at a higher temperature to the part at a lower temperature. Similarly, a positive charge (free to move) flows from a point at a higher electric level to a point at a lower electric level and a negative charge (free to move) flows from a point at a lower electric level to a point at a higher electric level. The electric level deciding the direction of flow of electric charge is called electrostatic potential (electric potential).

**3) What is an electric cell? What is its main function?**

**Ans :** An electric cell is a general device used to produce a uniform flow of charges in a circuit. Its main function is to maintain a constant potential difference between its two terminals.

**4) What is an electromagnet? State its applications.**

**Ans :** If a coil is wound around an iron screw (or an iron rod) and a current is passed through the coil with a cell (or a battery), the screw behaves as a magnet as long as there is current in the coil. The system of the coil and the screw is called an electromagnet. It is an example of magnetic effect of electric current.

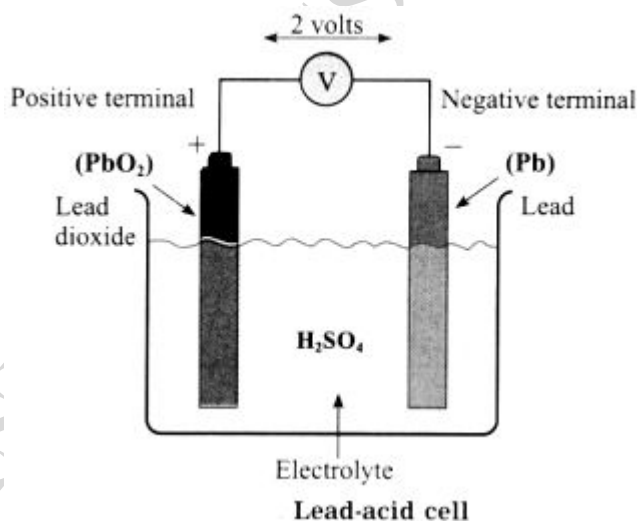
**Applications:** Electric bell, cranes for moving heavy loads from one place to another, toys that run on electric cells.

**Q.3 : Solve any two of the following question.**

6

**1) Draw a neat labelled diagram to show the design of the lead-acid cell and explain its principle of working.**

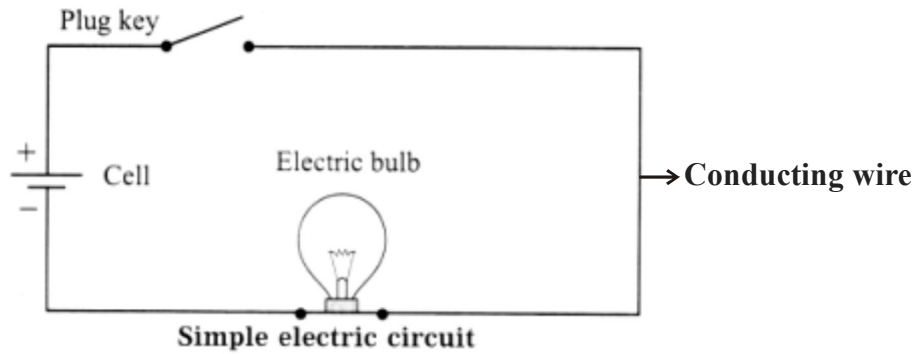
**Ans :** The lead-acid cell contains two electrodes, Pb and PbO<sub>2</sub>, dipped in dilute H<sub>2</sub>SO<sub>4</sub>. Chemical reaction between the substances in the cell produces electric charges on the electrodes. PbO<sub>2</sub> carries a positive charge and Pb carries a negative charge. The potential difference between the electrodes is nearly 2V.



If a load, such as a bulb, is connected externally between the two electrodes, an electric current flows through it. It can deliver a large current. This cell can be recharged after getting electrically discharged.

2) Draw a neat labelled diagram of a simple electric circuit containing a cell, an electric bulb and a plug key. What happens when the key is (i) open (ii) closed?

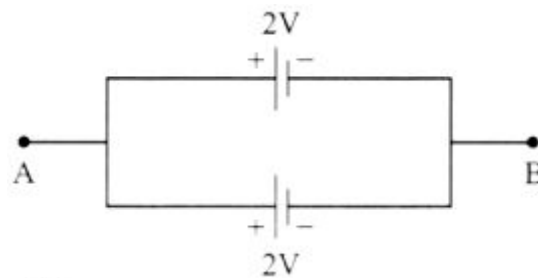
Ans :



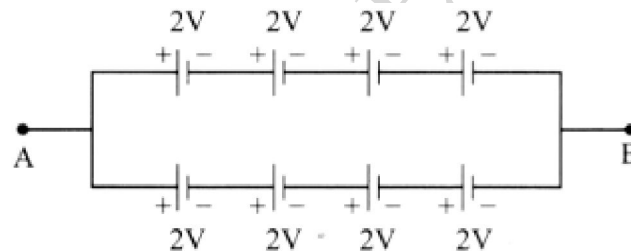
- i) When the key is open, there is no current in the circuit. Hence, the bulb does not glow.
- ii) When the key is closed, a current flows in the circuit. Hence, the bulb glows.

3) You must have seen the car battery available in the market. It is called a battery and not a cell. Why?

Ans : In a car battery, a number of cells are connected in series to obtain more potential difference.



Here, two identical cells are connected in parallel. The potential difference between A and B is 2V. This arrangement can be used for a longer time compared to a single cell.



Series and parallel arrangement for higher potential difference and longer life.

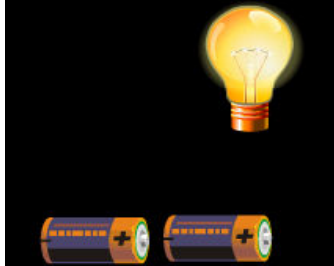
Here, the potential difference between A and B is 8V.

4) 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 : 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 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 not 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.

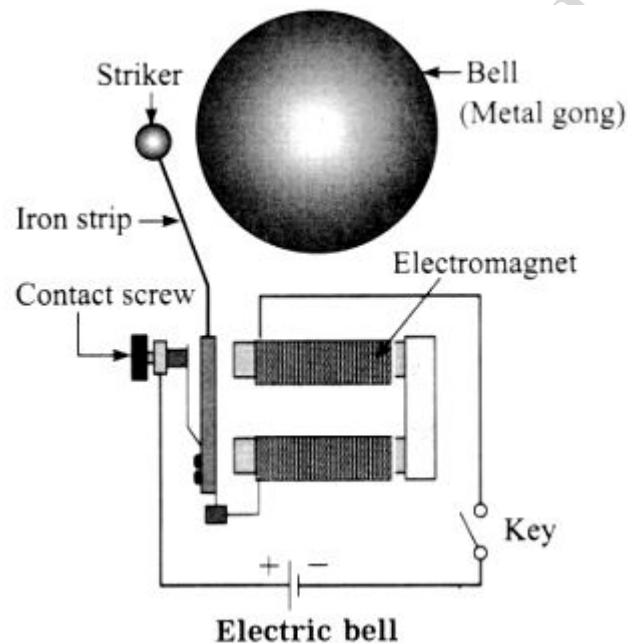


**Q.4 :** Solve any One of the following question.

5

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

**Ans :** Figure shows the construction of an electric bell and also the electric circuit. The bell consists of an electromagnet, contact screw, iron strip, metal striker and metal gong. A coil of copper wire wound around an iron piece works as an electromagnet and an iron strip along with a striker is fitted near it. A contact screw touches the strip.



The circuit is closed with the key. The current flows in the circuit when the screw is in contact with the iron strip. The current-carrying coil becomes a magnet and attracts the iron strip towards it. As a result, the metal striker hits the metal gong producing sound. At the same time, the screw loses the contact with the strip. The circuit is now incomplete.

Hence, no current flows in the circuit. Therefore, the electromagnet loses its magnetism and the electric iron strip returns to its initial condition, making contact with the screw. As the circuit is now completed, the electromagnet attracts the iron strip and the striker strikes the gong producing sound.

The action repeats itself and the bell continues to ring till the circuit is broken by opening the key in the circuit.

The working of the electric bell is thus based on the magnetic effect of electric current

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

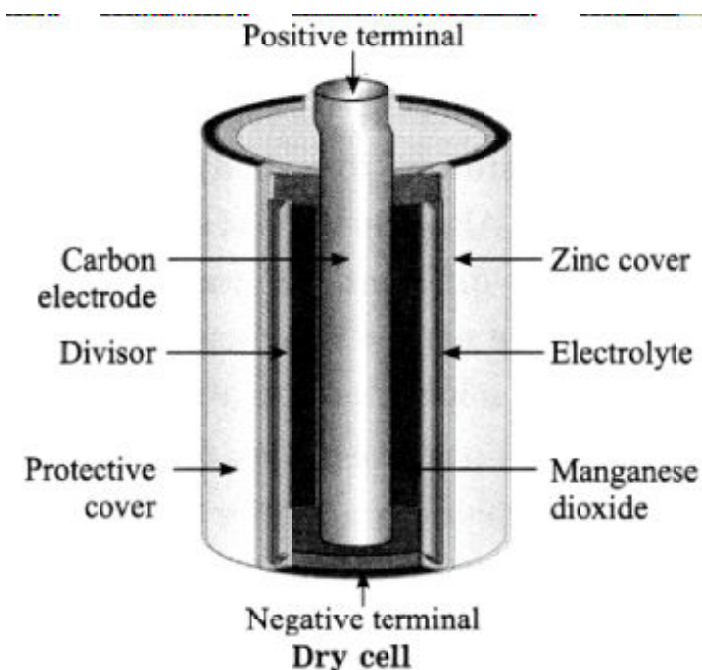
Ans : Construction of dry cell

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 graphite 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 used in torch, T.V. or A.C remote controls, toys, etc.

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