

Chapter: 1 Magnetic, Heating and Chemical Effects of Electric Current

I. Very Short Answer

1. Why is CFL preferred over an electric bulb?

Answer: CFL consumes less electrical energy and produces more light with less heat.

2. How is the conductivity of liquids tested?

Answer: By passing electric current through the liquid using a tester. If the bulb glows or LED lights up, the liquid conducts electricity. 8. Give an example of the chemical effect of electric current.

Answer: Electroplating of metals is an example of the chemical effect of electric current.

3. Why is tin electroplated on iron to make cans used for storing food?

Answer: Tin prevents iron from rusting and does not react with food materials.

4. What are electrodes?

Answer: Electrodes are conductors through which electric current enters or leaves an electrolyte.

5. Give any two examples of liquid conductors.

Answer: Lemon juice and salt solution.

II. Short Answers (3 Marks)

1. Does electric current have any other effect except heating? Name it.

Answer:

Yes. Besides the heating effect, electric current also produces:

1. Magnetic effect – used in electric bells, motors, and cranes.

2. Chemical effect – used in electroplating and purification of metals.

2. Do you think an electromagnet can be used for separating plastic bags from a garbage heap? Explain.

Answer:

No. An electromagnet attracts only magnetic materials such as iron, nickel, and cobalt. Plastic bags are non-magnetic materials and are not attracted by magnets. Therefore, an electromagnet cannot be used to separate plastic bags from a garbage heap.

3. When does the overloading of a household electric circuit occur?

Overloading occurs when the total current drawn exceeds the capacity of the wires. This happens when:

- Too many high-power appliances are connected to a single socket simultaneously.
- Live and neutral wires accidentally touch directly, causing a short circuit.

4. What happens when a compass needle is brought near to a current-carrying wire?

- The compass needle deflects from its original north-south position.
- This happens because the electric current generates a magnetic field around the wire.

5. Why is chromium used for electroplating? Why are the objects not made of chromium itself?

- Why used for plating: Chromium has a shiny appearance, does not corrode easily, and resists scratches.
- Why objects aren't solid chromium: Chromium is highly expensive and brittle. Making the entire object out of it is economically impractical and structurally weak.

6. What are anodes and cathodes?

- Anode: The positively charged electrode connected to the positive terminal of the battery. It attracts negatively charged ions (anions).
- Cathode: The negatively charged electrode connected to the negative terminal of the battery. It attracts positively charged ions (cations).

What do you understand by electrolysis? How is it useful in industry?

Refer Pg.no :1.10

III. Long Answers (5 Marks)

1. What is the heating effect of electric current? Explain briefly.

- Definition: The production of heat in a resistor due to the flow of electric current through it is called the heating effect.
- Mathematical Formula: Given by Joule's Law of Heating: $H = I^2 R t$ (where (H) = Heat, I = Current, R = Resistance, t = Time).
- Explanation: When current passes through high-resistance materials (like Nichrome wire), electrons face heavy resistance and experience frequent collisions. This converts a large amount of electrical energy into thermal energy, making the wire glow red-hot.
- Applications: Used in everyday appliances like electric irons, toasters, room heaters, geysers, and hair dryers.

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2. Solid copper sulphate does not conduct electricity but when it is dissolved in water, it does conduct electricity. Why?
- In Solid State: Copper sulphate forms a rigid crystal lattice. The constituent copper ions and sulphate ions are bound together tightly by strong electrostatic forces. Because they cannot move freely, they cannot conduct electricity.
 - In Aqueous State: When dissolved in water, the water molecules break the lattice bonds. This releases the copper and sulphur ions, allowing them to move freely throughout the solution. When a voltage is applied, these free ions migrate toward the opposite electrodes, successfully carrying the electrical current.