



INDIAN SCHOOL AL WADI AL KABIR



CLASS: VIII	DEPARTMENT: SCIENCE 2025-26	DATE: 18/10/2025
WORKSHEET NO:7 WITH ANSWERS	TOPIC: ELECTRICITY: MAGNETIC AND HEATING EFFECTS	NOTE: A4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

I. OBJECTIVE-TYPE QUESTIONS:

1. A student is trying to demonstrate the magnetic effect of electric current. The compass needle barely moves when the switch is ON. What change should the student make to achieve a larger, clearer deflection of the compass needle?

- (a) Replace the magnetic compass with a non-magnetic material.
- (b) Use a thinner wire of the same material.
- (c) Replace the single cell with a battery of two or four cells.
- (d) Reduce the number of turns of the wire.

2. An electric room heater uses a long coil of wire called the heating element. What special property must this wire material have to make the heater effective?

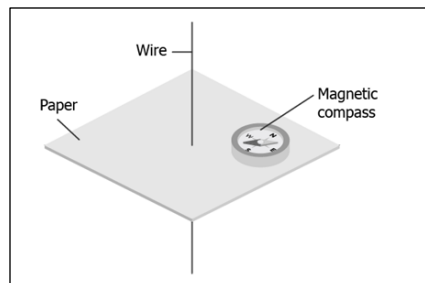
- (a) It must have very low resistance.
- (b) It must be a poor conductor of electricity.
- (c) It must be made of pure copper.
- (d) It must offer high resistance to the flow of current.

3. A repair person opens a broken electric bell and finds a coil of wire wrapped around an iron piece. What is the function of this specific component within the electric bell?

- (a) It converts electrical energy directly into sound energy.
- (b) It acts as a temporary magnet only when current passes.
- (c) It is a permanent resistor used to limit the current flow.
- (d) It converts mechanical energy into electrical energy.

4. A student performed an experiment where he placed a magnetic compass near a current-carrying wire. She notices some deflection in the compass needle. What causes the deflection of the needle in the compass?

- (a) Magnetic effect of the electric current
- (b) Electric effect of the magnetic compass
- (c) Magnetic effect of the compass on paper
- (d) Electric effect of the paper on the compass



5. An experiment requires connecting two different metal plates (say, a zinc strip and a copper strip) to create a simple cell. What component is essential to complete this setup and facilitate the chemical reaction that generates electricity?

- (a) Dry air
- (b) An insulating block
- (c) A plastic casing
- (d) An electrolyte

6. A large electromagnet is used in a factory to lift heavy iron sheets. For practical applications, what special core material does the electromagnet use to ensure maximum strength?

- (a) Copper
- (b) Iron
- (c) Aluminium
- (d) Rubber

7. Which of the following devices, when used in a household, primarily operates based on the magnetic effect of electric current?

- (a) Electric stove
- (b) Electric iron
- (c) Electric kettle
- (d) Electric fan

For question numbers 8-10, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii), and (iv) as given below -

- i) Both A and R are true, and R is the correct explanation of the assertion.**
- ii) Both A and R are true, but R is not the correct explanation of the assertion.**

iii) A is true, but R is false.

iv) A is false, but R is true

8. **Assertion (A):** The polarity (North and South poles) of an electromagnet can be reversed.

Reason (R): The direction of current in the coil can be reversed, which changes the polarity of the electromagnet.

9. **Assertion (A):** In an electric stove, if the coil is replaced with a copper wire of the same length and thickness, the stove will not function as an effective heater.

Reason (R): Heat is produced due to the resistance of the conductor, and copper wire has much higher resistance than the Nichrome element.

10. **Assertion (A):** In a dry cell, the central carbon rod acts as the negative terminal, and the zinc container acts as the positive terminal.

Reason (R): The chemical reactions within a cell convert chemical energy into electrical energy.

II. VERY SHORT ANSWER TYPE QUESTIONS (2M):

1. What is meant by the magnetic effect of electric current? **[Hint: When electric current flows through a conductor (like a wire), it produces a magnetic field around it. This phenomenon is called the magnetic effect of electric current.]**

2. State two uses of lifting electromagnets.

[Hint: Lifting electromagnets are widely used in factories and scrap yards to move, lift, and sort heavy metal items efficiently]

3. Why are rechargeable batteries considered more environmentally friendly than disposable ones?

[Hint: Rechargeable batteries can be recharged and reused multiple times. This prevents wastage and saves resources.]

4. How do using electrical appliances for heat and burning fuels like wood or coal affect the environment and society in the long run? **[Hint: Burning fuels like wood and coal causes pollution and adds to global warming. Using electricity for heating is cleaner, safer, and more convenient for society. So, choosing cleaner energy sources helps protect the environment and improves our quality of life.]**

5. Define an electromagnet. How is it different from a permanent magnet? **[Hint: An electromagnet is a current-carrying coil that behaves like a magnet.]**

Electromagnet → Works only when electric current flows; its magnetism disappears when the current stops.

Permanent magnet → Always magnetic, even without current]

III. SHORT ANSWER TYPE QUESTIONS: (3M)

1. Differentiate between a Voltaic cell and a Dry cell based on the state and material of their internal components.

Ans:

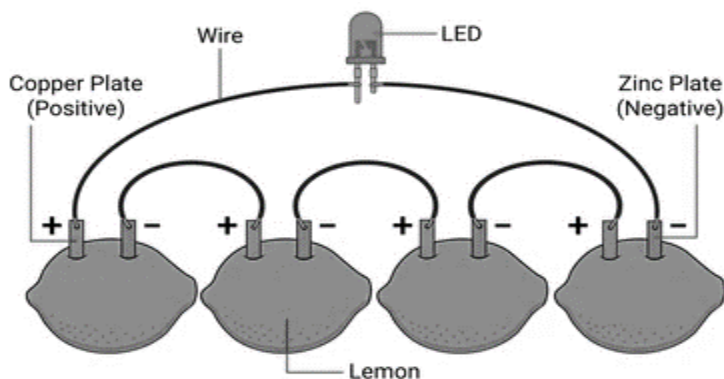
Feature	Voltaic Cell	Dry Cell
State of electrolyte	Contains a liquid electrolyte (usually a weak acid or salt solution)	Contains a paste-like electrolyte (thick, moist paste)
Material of container/electrodes	It contains two metal plates made of different materials and an electrolyte, placed in a glass or plastic container.	The zinc container acts as the negative terminal, and a carbon rod with a metal cap acts as the positive terminal

2. State the ways by which the strength of an electromagnet can be changed.

Ans: The strength of an electromagnet can be changed in the following ways:

- **Changing the current: Increasing the current in the coil increases the magnetic field, making the electromagnet stronger. Decreasing the current weakens it.**
- **Changing the number of turns in the coil: More turns of wire in the coil produce a stronger magnetic field. Fewer turns make it weaker.**
- **Using a different core material: Using a highly magnetic material like soft iron as the core strengthens the electromagnet. A less magnetic material weakens it.**

3. Observe the given figure and answer the following questions:



(a) In the setup shown, identify the electrodes in each lemon half. **[Hint: The zinc plate acts as the negative electrode and the copper plate acts as the positive electrode]**

(b) Why are the lemon halves connected in series in this setup? What would happen if only one lemon half were used? **[Hint: The lemon halves are connected in series to increase the total voltage. Each lemon produces a small voltage, so combining them in series adds up the voltages to light the bulb. If only one lemon half were used, the voltage would be too low to make the flashlight bulb glow.]**

(c) If one of the connections between the lemons is removed, how will it affect the brightness of the flashlight bulb? Explain your answer. **[Hint: If one connection is removed, the series circuit is broken, so current will not flow. As a result, the flashlight bulb will go off because an open circuit stops the electrical flow.]**

4. (i) When the flow of current stops in the coil, what happens to the magnetic field around the electromagnet? **[Hint: When the current stops flowing (the circuit is in the switch OFF position), the magnetic field around the electromagnet disappears, and then the electromagnet does not attract any magnetic substances.]**

(ii) What is the industrial use of the heating effect of electric current? **[Hint: The heating effect of electric current is used in steel manufacturing industries, where a specially designed high-temperature electric furnace melts and recycles scrap steel to produce usable steel.]**

5. What safety precautions should you take while performing experiments involving electric current? **[Hint: Handle electric current carefully, do not touch wires or equipment with wet hands, use properly insulated wires, follow the given instructions during experiments, Work with dry cells only; never use mains electricity.]**

IV. LONG ANSWER TYPE QUESTIONS (5M):

1. Describe the experiment of making an electromagnet using a coil and a nail. What are the observations, and how does this experiment show the magnetic effect of electric current?

Ans:

- ☐ **Take a nail and wrap a copper wire around it to form a coil.**
- ☐ **Connect the ends of the wire to a battery (dry cell).**
- ☐ **Bring small iron objects (like pins or paper clips) near the nail.**

Observation: The nail attracts the iron objects when current flows through the wire.

Explanation: This shows that an electric current produces a magnetic field, turning the nail into an electromagnet.

2. Explain the heating effect of electric current using a Nichrome wire. What factors influence the heat produced in the Nichrome wire, and in which appliances is Nichrome wire commonly used?

Ans: When an electric current passes through a Nichrome wire, the wire becomes hot.

Factors affecting the heat produced:

- **Current: Higher current produces more heat.**
- **Resistance of the wire: Nichrome has high resistance, so it produces more heat.**
- **Length of the wire: Longer wire produces more heat due to increased resistance.**
- **Thickness: Thinner wire produces more heat because of higher resistance.**
- **Time: Longer duration of current flow increases the heat.**

Uses of Nichrome wire: Commonly used in electric heaters, toasters, and electric irons.

V. CASE STUDY- BASED QUESTIONS/PASSAGE-BASED QUESTIONS:

Riya wanted to make toast for breakfast. She noticed that the heating element in her toaster became red-hot when she switched it on. Curious, she asked her father why it got hot so quickly. He explained that the thin Nichrome wire inside the toaster gets heated when an electric current passes through it.

(i) What is the effect observed in the wire called? **[Hint- Heating effect of electric current]**

(ii) Which property of Nichrome wire makes it suitable for generating heat in the toaster?

[Hint: Nichrome has high resistance, making it suitable for generating heat.]

(iii) What would happen if the toaster were left on for a longer time? **[Hint: The wire would get hotter]**

(iv) How does the thickness of the Nichrome wire affect the heat produced? **[Hint: Thinner wire produces more heat; thicker wire produces less heat.]**

ANSWERS FOR THE QUESTIONS 1 TO 10

1. (c) Replace the single cell with a battery of two or four cells

2. (d) It must offer high resistance to the flow of current.

3. (b) It acts as a temporary magnet only when current passes.

4. (a) Magnetic effect of the electric current

5. (d) An electrolyte

6. (b) Iron

7. (d) Electric fan

8. i – Both A and R are true, and R is the correct explanation of the assertion

9. iii – A is true, but R is false

10. iv – A is false, but R is true

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