

SCIENCE
WORKSHEET_030924
CHAPTER 04 ELECTRICITY: MAGNETIC AND HEATING EFFECTS

SUBJECT: SCIENCE

CLASS : VIII

MAX. MARKS : 40

DURATION : 1½ hrs

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). **Use of Calculators is not permitted**

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. A student connects a simple circuit with an electric cell and a wire. She places a magnetic compass near the wire. Which of the following observations indicates that electric current is flowing in the wire?
(a) The wire becomes hot.
(b) The magnetic compass needle deflects from its original direction.
(c) The compass needle does not move at all.
(d) The wire attracts small pieces of paper.
2. Which of the following household appliances works on the principle of the heating effect of electric current?
(a) Electric fan (b) Loudspeaker (c) Electric iron (d) Electromagnet
3. A student makes an electromagnet by winding a coil of wire around an iron nail and connecting it to a cell. She notices that the electromagnet can only pick up a few paper clips. What is the most effective way to make the electromagnet stronger?
(a) Use a longer iron nail. (b) Use a thinner wire.
(c) Increase the number of turns of the coil. (d) Change the direction of the current.
4. The Voltaic cell is named after which Italian scientist who believed electricity came from the combination of metals and liquid, not from a dead frog's leg?
(a) Luigi Galvani (b) Hans Christian Oersted
(c) Alessandro Volta (d) Isaac Newton
5. An electromagnet is a temporary magnet. Which of the following conditions must be met for it to function as a magnet?
(a) The circuit must be open.
(b) An electric current must flow through the coil.
(c) A permanent bar magnet must be placed nearby.
(d) The wire must be made of a non-conducting material.
6. Which of the following statements is true about the heating effect of electric current?
(a) It is always a problem and a source of energy loss.
(b) It forms the basis of devices like an electric stove and an electric kettle.
(c) It is only observed in wires with high resistance.
(d) It is the same as the magnetic effect of electric current.

7. Why do household circuits have safety devices in place?
(a) To increase the magnetic field. (b) To minimize the heating effect of electric current.
(c) To make the circuit more decorative. (d) To make the circuit reusable.
8. What is the function of the electrolyte in a Voltaic cell?
(a) It acts as a negative electrode.
(b) It produces electricity by chemical reaction with the electrodes.
(c) It acts as an insulator.
(d) It holds the two electrodes apart.

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

9. Assertion (A): A nichrome wire is a good conductor of electricity.

Reason (R): Nichrome wire offers higher resistance and generates more heat compared to a copper wire of the same size and length.

10. Assertion (A): The strength of an electromagnet can be increased by using a battery with more cells.

Reason (R): A battery with more cells provides a larger current, which creates a stronger magnetic field.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Why does a compass needle deflect when placed near a current-carrying wire, but return to its original position when the current is stopped?
12. What is an electromagnet? List two of its practical applications.
13. How does the heating effect of electric current cause an incandescent lamp to glow?
14. Explain why a dry cell is considered a "single use" cell, while a rechargeable battery can be used multiple times.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. State the factors that affect the amount of heat generated in a wire due to electric current.
16. Describe the key components of a Voltaic cell and explain how it generates electricity.
17. A student makes an electromagnet and finds its poles by using a magnetic compass. What would happen to the poles of the electromagnet if the direction of the current flowing through the coil is reversed? Justify your answer.

SECTION – D

Questions 18 carry 5 marks each.

18. Explain the magnetic effect of electric current. How can the strength of the magnetic field produced by a current-carrying coil be changed? Describe two ways to do this.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Case Study-1: The Recycling Plant Crane

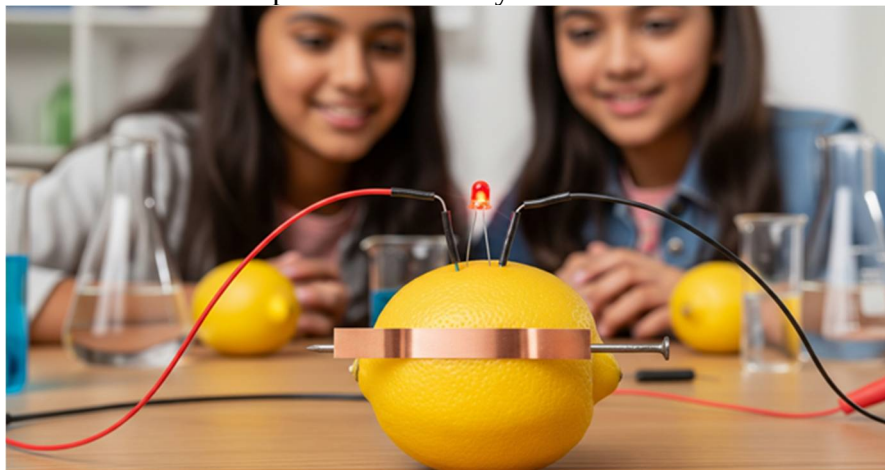
In a bustling recycling plant, a large crane operator, named Arjun, controls a powerful lifting electromagnet to sort and move heavy metal waste. He uses a switch in his control cabin to turn the magnet on and off. When he turns the switch ON, the electromagnet attracts and lifts huge pieces of scrap metal. As he moves the crane over the correct collection bin, he turns the switch OFF, and the metal pieces fall cleanly into place. This process is highly efficient and safe, allowing the plant to handle large quantities of metal waste quickly and effectively.



- (i) What is the function of the switch in Arjun's control cabin? [1]
- (ii) Why do the metal pieces fall when Arjun turns the switch OFF? [1]
- (iii) Why is an iron core used in lifting electromagnets? [1]
- (iv) Can the lifting electromagnet lift a heavy piece of plastic? Justify your answer. [1]

20. Case Study-2: The Lemon Battery Experiment

Riya and her friends are trying to make a simple electric cell using lemons as part of their science project. They insert a copper strip and an iron nail into a lemon, ensuring the two metals do not touch. They connect the lemon to an LED. The LED glows dimly. Riya is fascinated and realizes that the lemon juice acts as a crucial component of the cell. She notes down that a chemical reaction is taking place inside the lemon to produce electricity.



- (i) In the lemon cell, what is the role of the lemon juice? [1]
- (ii) What would happen if Riya replaced the lemon juice with pure water? Why? [1]
- (iii) Why did the LED glow dimly? [1]
- (iv) What components of this lemon cell can be compared to the electrodes and electrolyte of a Voltaic cell? [1]