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MAGNETIC AND HEATING EFFECTS

Worksheet-1

Multiple Choice Questions

- The deflection of a compass needle near a current-carrying wire shows that**
 - Heat is produced
 - A magnetic field is produced
 - Electric charge moves
 - None of these
- An electromagnet becomes stronger when**
 - The number of turns is reduced
 - Current is increased
 - Iron core is removed
 - Copper wire is replaced with cotton thread
- Which wire is commonly used in heating devices?**
 - Copper
 - Nichrome
 - Aluminium
 - Steel
- Adrycell contains**
 - Liquid electrolyte
 - Two identical metal plates
 - Moist paste electrolyte
 - Only distilled water
- The positive terminal of a dry cell is the**
 - Zinc container
 - Electrolyte paste
 - Carbon rod with metal cap
 - None of these
- A lifting electromagnet works on the principle of**
 - Heating effect
 - Chemical effect
 - Magnetic effect
 - Electrolysis
- Heat produced in a wire depends on**
 - Length and material of wire
 - Colour of wire
 - Shape of wire
 - Direction of current only
- A lemon battery glows an LED because**
 - Lemon makes the LED hot
 - Lemon juice acts as electrolyte
 - The LED produces electricity
 - Iron nail becomes a permanent magnet
- Rechargeable batteries differ from dry cells because they**
 - Are larger in size
 - Have no electrolyte
 - Can be reused many times
 - Do not require charging

10. An electromagnet has two poles:

- (a) Only when current flows
- (b) Only when disconnected
- (c) Even without current
- (d) It never has poles

Fill in the blanks :

- 11. A current-carrying wire produces a _____ around it.
- 12. A coil with an iron core that acts like a magnet is called an _____.

True / False

- 13. A coil behaves like a magnet only when electric current flows through it.
- 14. Nichrome wire does not get heated by electric current.

Very Short Type Questions

- 15. What is the magnetic effect of electric current?
- 16. Why does nichrome wire get heated when electric current flows through it?

Short Type Questions

- 17. What factors affect the strength of an electromagnet?
- 18. Explain why a dry cell is called a portable source of electricity.

Essay Type Questions

- 19. Explain the heating effect of electric current. Discuss its applications and safety precautions with examples.
- 20. Describe in detail the construction, working, and advantages of electromagnets. Also explain how their strength can be increased.

HOTS

- 21. **Assertion (A):** A coil becomes a magnet only when electric current flows through it.
Reason (R): The current in the coil produces a magnetic field around it.

Choose the correct option:

- 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
- c) A is true but R is false
- d) A is false but R is true



1. (b) A magnetic field is produced
2. (b) Current is increased
3. (c) Nichrome
4. (c) Moist paste electrolyte
5. (b) Carbon rod with metal cap
6. (c) Magnetic effect
7. (a) Length and material of wire
8. (b) Lemon juice acts as electrolyte
9. (b) Can be reused many times
10. (a) Only when current flows
11. Magnetic field
12. Electromagnet
13. True
14. False
15. The magnetic effect of electric current is the phenomenon in which a current-carrying conductor produces a magnetic field around it, causing a compass needle near it to deflect.
16. Nichrome wire gets heated because it offers high electrical resistance. This resistance converts part of the electrical energy into heat when current flows through it.
17. The strength of an electromagnet depends on the number of turns in the coil, the amount of current passing through the coil, and the presence of an iron core. More turns and higher current make it stronger, while inserting a soft iron core greatly increases its magnetic power.
18. A dry cell is called a portable source of electricity because it is compact, lightweight, sealed, easy to carry, and can supply electricity anywhere without requiring external connections or large equipment. It provides a convenient power supply for torches, remotes, radios, and many small devices.
19. When electric current flows through a conductor, it faces resistance, which converts electrical energy into heat energy. This is known as the heating effect of electric current. Nichrome wires heat up more because they have higher resistance. The amount of heat produced depends on the material, length, thickness of the wire, magnitude of current, and duration of flow. This effect is used in many appliances such as electric heaters, irons, kettles, room heaters, toasters, hair dryers, and immersion rods where the heating element becomes hot enough to perform useful tasks. However, careless use may lead to overheating, melting of insulation, or electrical fires. Proper wiring, using correct-rated fuses, avoiding overloading of circuits, and selecting suitable power-rated appliances are essential safety precautions. Thus, the heating effect is both useful and potentially dangerous if not handled carefully.

20. Construction

An electromagnet is made by:

1. Taking a soft iron core (nail, rod, etc.).
2. Wrapping it with many turns of insulated copper wire.
3. Connecting the ends of the wire to a battery or power supply.

Working

- When electric current flows through the coil, the iron core becomes a magnet.
- It shows all magnetic properties (attracts iron, has north and south poles).
- When the current is switched off, the magnetism disappears.

This is why it is called an electro-magnet (magnetism by electricity).

Advantages of Electromagnets

- They can be switched ON or OFF.
- Their strength can be controlled by changing the current.
- They are stronger than permanent magnets for many uses.
- They are used in cranes to lift heavy iron scrap, electric bells, relays, speakers, and motors.

How to Increase the Strength of an Electromagnet

1. Increase the number of turns of the coil.
2. Increase the current in the coil .
3. Use a soft iron core instead of steel.
A soft iron core becomes strongly magnetized and also loses magnetism quickly when the current stops.

21. Correct Answer: (A)

Explanation:

The assertion is true because a coil acts like a magnet only when current flows. The reason is also true because the magnetic field is produced by the flowing current, which explains the assertion correctly.