

St. Andrews Scots School

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Session: 2026-2027 – Answer Key

Class: VIII Subject: Science Chapter: Electricity – Magnetic and Heating Effects

Big Question: Page No. 49

Electricity can create magnets and produce heat when it flows through a conductor. When electric current passes through a wire wound around an iron nail, the nail becomes a temporary magnet. This happens because the flow of current produces a magnetic field around the wire. Such magnets made using electricity are called electromagnets and they are used in devices like electric bells and cranes. Electricity can also produce heat when it flows through materials that resist the movement of electric current. This effect is called the heating effect of current. The wire or filament in devices like electric heaters, irons and bulbs becomes hot when current passes through it. Thus, electricity can be used to make magnets and generate heat depending on how and where it flows.

Think Beyond: Page No. 50

When the current is switched off, the iron nail will stop behaving like a magnet. This is because the magnetic field is produced only when electricity flows through the wire. Once the flow of current stops, the magnetic field disappears and the nail loses its magnetism. Such a magnet is called a temporary magnet or electromagnet.

Look Around: Page No. 50

Magnets that can be switched on and off, called electromagnets, are helpful because they can be controlled using electricity. In cranes, they are used to lift heavy metal objects and drop them easily by switching the current off. In electric bells, the electromagnet attracts and releases parts of the bell repeatedly when the current flows, helping it ring. This makes electromagnets very useful in devices that need controlled magnetic action.

Self-Assessment: Page No. 51

A. Multiple Choice Questions:

Tick (✓) the correct options:

1. (c) 2. (c) 3. (c) 4. (b) 5. (d)

B. Think and Answer:

We call an electromagnet a ‘temporary’ magnet because it shows magnetic properties only when electric current flows through it. When the current is switched off, it loses its magnetism.

Self-Assessment:

A. Multiple Choice Questions:

Tick (✓) the correct options:

1. (c) 2. (b) 3. (c) 4. (c) 5. (a)

B. Assertion-Reason Based Questions:

1. (a) 2. (a)

EXERCISE

SECTION-A

A. Oral Questions:

1. The compass needle moves, showing that a magnetic field is produced around the current-carrying wire.
2. An electromagnet works only when current flows because the electric current creates the magnetic field needed for magnetism.
3. The nichrome wire heats up because it resists the flow of electric current and this resistance produces heat.

B. Multiple Choice Questions:

Tick (✓) the correct options:

1. (c) 2. (c) 3. (b) 4. (b) 5. (c) 6. (d)

C. Assertion-Reason Based Questions:

1. (a)
2. (c) Explanation: The assertion is true because increasing the number of turns in a coil strengthens the magnetic field of an electromagnet. The reason is false because greater resistance actually weakens, not strengthens, the magnetic field. More turns of wire increase the magnetic effect, not resistance.

D. Case-Based Questions:

1. The lemons act as electrolytes in the setup.
2. The LED is glowing faintly because the electric current produced by the lemons is very weak.
3. Anaya can increase the brightness by connecting more lemons in series or using larger lemons to produce more current.

SECTION-B

A. Very Short Answer Questions:

1. Resistance is the opposition offered by a material to the flow of electric current.
2. The carbon rod acts as the positive terminal of a dry cell.
3. Lifting electromagnets are powerful electromagnets used in cranes to lift and move heavy iron or steel objects.

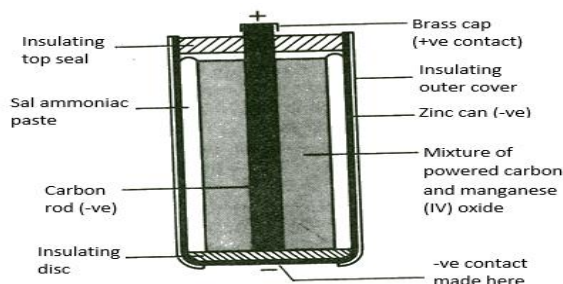
B. Short Answer Questions:

1. A magnetic field is the region around a magnet or current-carrying wire where magnetic force can be felt. It can be detected using a compass needle, which moves when placed in the field.
2. Two differences between dry cells and rechargeable batteries:
 - A dry cell is used once and then discarded, while a rechargeable battery can be used many times.
 - A dry cell produces limited current, while a rechargeable battery can supply higher current.
3. Nichrome wire heats up more than copper wire because it has higher resistance, which converts more electrical energy into heat.

C. Long Answer Questions:

1. An electromagnet is made by winding insulated copper wire around an iron nail and connecting it to a cell. When current flows, the nail becomes magnetic and attracts small objects like pins. When the current is switched off, it loses its magnetism.
2. A standard dry cell consists of several key parts, each designed for a specific function. The outer casing, often made of zinc, serves as the anode (negative electrode), while a central carbon rod acts as the cathode (positive electrode). Between these electrodes lies an electrolyte paste, commonly composed of ammonium chloride, and a separator to prevent direct contact between the electrodes.

The dry cell operates by converting chemical energy into electrical energy through redox reactions. When connected to a circuit, the zinc anode undergoes oxidation, releasing electrons. These electrons move through the external circuit toward the carbon cathode, providing the electric current necessary to power devices.



3. Increasing the number of turns of wire or the number of cells in the circuit increases the current and strengthens the electromagnet's magnetic field.

D. Application-Based Questions:

1. The lemon acts as a natural electrolyte containing acids that help generate a small electric current when metals like copper and zinc are inserted. By connecting several lemons in a series, Shweta can create a simple lemon battery to light a small LED. This activity helps her understand how chemical energy is converted into electrical energy.

2. No, magnets do not always attract. Some magnets, like electromagnets, can be switched on and off using electricity. When the electric current flows, the electromagnet attracts objects; when the current is switched off, it loses its magnetism.

F. Life Skills:

Advise the person to:

- Switch off the heater when not in use.
- Avoid using it near water or with damaged wires.
- Keep it on a flat, non-flammable surface.
- Never cover the heater while it is on to prevent overheating and fire hazards.