CLASS 8 · SCIENCE

Electricity: Magnetic and Heating Effects

Sample paper · 15 questions · 22 marks

10 objective questions × 1 mark. Five written-response questions: 12 marks. Write your working where needed. Suggested time: 45 minutes. Answers and marking guidance follow the questions.

Original Evater practice material aligned with these school topics. Not an official NCERT paper or marking scheme. No automatic grading is implied.

Section A · Objective questions (10 marks)

1. A magnetic compass is placed near a wire. A deflection that appears when a low-voltage circuit is switched on demonstrates the current's:

A. Magnetic effect

B. Chemical composition

C. Mass

D. Colour

2. Which arrangement makes a simple classroom electromagnet?

A. An insulated coil around an iron nail carrying current

B. A dry wooden stick alone

C. An unconnected coil with no magnet nearby

D. A glass rod in darkness

3. With current and turns unchanged, adding an iron core to a classroom coil usually makes its magnetic effect:

A. Always zero

B. A source of light only

C. Unrelated to the coil

D. Stronger

4. Which change is expected to weaken an electromagnet, with other conditions fixed?

A. Reducing the current

B. Adding an iron core

C. Using more turns at the same current

D. Increasing the current

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5. The useful effect in a resistance heater is mainly:

A. Electrical energy transferred to heat

B. Light travelling backwards

C. Water turning into iron

D. Magnetism disappearing permanently

6. A wire remains warm just after a switch is opened. Which conclusion is justified?

A. The circuit must use mains electricity

B. The cell must be new

C. Current must still be flowing

D. It may retain heat from earlier current

7. Which is the safer classroom way to look for current in an electric-cell circuit?

A. Touch exposed wire until it feels hot

B. Connect the wire to mains

C. Compare a nearby compass with switch off and on

D. Short the cell for several minutes

8. Why is insulated wire used for the turns of a coil?

A. To replace the cell

B. To turn iron into copper

C. To make all current disappear

D. To prevent unintended contact between adjacent turns

9. Compared with burning smoky solid fuel indoors, electric cooking produces:

A. No fuel-combustion smoke at the appliance

B. No need for electrical energy

C. Smoke from burning wood inside the appliance in every case

D. No environmental impacts anywhere

10. When the switch opens a simple cell-and-coil circuit, the current normally:

A. Increases without limit

B. Stops in the broken circuit

C. Turns into water

D. Flows equally through the air gap

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Section B · Written responses (12 marks)

Attempt all five. Use a separate sheet if you need more space. The marks for each question are shown.

11. A cell-powered coil with an iron core stops lifting clips after being left on. Give one plausible cause, explain its effect, and say why a warm wire alone cannot prove that cause. [3 marks]

12. An iron core is removed from a coil while the current and compass position stay the same. Will the coil still have a magnetic effect, and how will its strength usually compare? [2 marks]

13. Describe how to make a temporary electromagnet using a cell, insulated wire, an iron nail and a switch. Include a safety limit. [2 marks]

14. A lamp is unavailable. Describe a non-touch test for current in a low-voltage classroom circuit and the comparison that makes it useful. [2 marks]

15. Give two societal benefits of replacing a smoky indoor fire with electric heating, then explain why this does not prove zero overall pollution. [3 marks]

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Answers & marking guidance

Use these after attempting the paper. Accept equivalent correct reasoning and sensible units. These are Evater model answers, not an official marking scheme.

Section A · 1 mark each

1. A — A current-carrying wire produces a magnetic field.

2. A — Current through a coil magnetises an iron core.

3. D — An iron core strengthens the coil's magnetic effect.

4. A — A smaller current generally gives a weaker magnetic field.

5. A — Current in a resistive element transfers energy as heat.

6. D — Residual warmth alone does not establish present current flow.

7. C — A controlled low-voltage compass test avoids using touch or overheating as the test.

8. D — Insulation helps stop neighbouring turns from shorting together.

9. A — Point-of-use smoke is avoided, but upstream impacts depend on electricity generation.

10. B — An open switch breaks the conducting path.

Section B · Model answers

11. The cell may have weakened, reducing current and magnetic pull. A poor connection is another plausible cause of reduced current. Warmth can remain from earlier current and does not uniquely identify a weak cell or prove that current still flows.

Marking: 1 mark for a plausible cause; 1 for a correct current/field link; 1 for the limit of warmth as evidence. Accept equivalent explanations.

12. Yes. A current-carrying coil still produces a magnetic field. Without its iron core, the magnetic effect is generally weaker in this classroom setup.

Marking: 1 mark for continued magnetic effect with current; 1 for weaker effect under unchanged conditions.

13. Wind the insulated wire around the nail and connect it through a switch to a low-voltage cell. Close the switch briefly to magnetise the core and open it afterward; do not use mains power or leave a heating coil connected.

Marking: 1 mark for coil/core/current construction; 1 for switching and a suitable low-voltage/overheating precaution.

14. Place a magnetic compass near the wire or coil, away from other magnets. Compare its direction with the switch open and closed. A reproducible switch-related deflection supports a magnetic effect from current.

Marking: 1 mark for compass placement; 1 for off/on comparison. Do not require touching the wire.

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15. Electric heating can reduce indoor smoke exposure and the effort of collecting solid fuel, and can offer convenient control. Its full environmental impact still depends on electricity generation and other upstream processes.

Marking: 1 mark each for two supported benefits; 1 for the upstream-impact qualification. Accept equivalent supported benefits.

Topic references

Concept references: current and magnetic effects; point-of-use smoke distinction.

https://openstax.org/books/physics/pages/20-2-motors-generators-and-transformers

https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health

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