



Unit 11 • Electricity and Magnetism: currents, fields and motors

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 33

1 Key words

[4]

Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

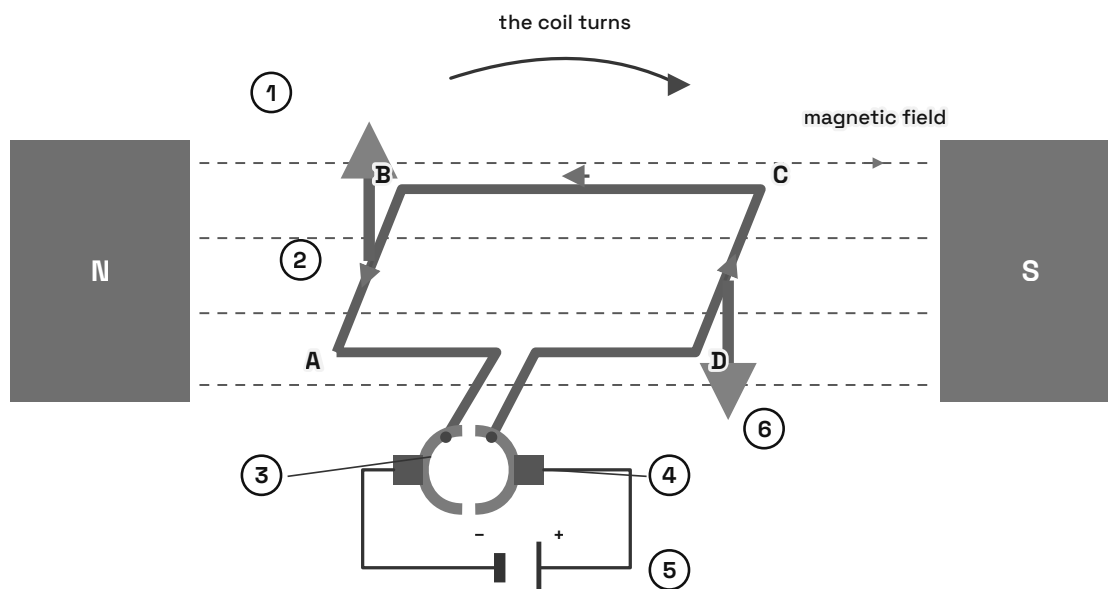
alternating current direct current electromagnet frequency generator magnetic effect
Oersted rectifier solenoid weber

A current that flows in one direction only is called _____. A current whose size and direction change again and again at regular intervals is _____. The number of cycles it completes in one second is its _____, measured in hertz. A device that changes a.c. into d.c. is a _____. The formation of a magnetic field around a conductor carrying a current is the _____ of current, discovered by _____ in 1820. A long cylindrical coil of insulated wire is a _____; with a soft iron core inside it, it becomes an _____.

2 Label the diagram

[3]

The diagram shows a simple d.c. motor. Name the parts, or the forces, numbered 1 to 6. Each carries 0.5 mark.



- | | |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |
| 5. _____ | 6. _____ |



[5]

Choose the correct option for each of the following questions.

- i. Which of the following is a source of a.c.? [1]
 - a. dry cell
 - b. solar panel
 - c. dynamo
 - d. voltaic cell
- ii. Which scientist discovered the magnetic effect of electric current? [1]
 - a. Michael Faraday
 - b. Hans Christian Oersted
 - c. John Ambrose Fleming
 - d. James Clerk Maxwell
- iii. What is the direction of the magnetic field when a current flows upwards through a straight wire (seen from above)? [1]
 - a. anticlockwise
 - b. clockwise
 - c. perpendicular to the direction of the current
 - d. opposite to the direction of the current
- iv. A is a bicycle dynamo and B is a battery torch. Which statement is true? [1]
 - a. The current produced by A is constant.
 - b. The current produced by B is alternating current.
 - c. The brightness of the lamp fluctuates if the current produced by A is used.
 - d. The direction of the current produced by B changes constantly.
- v. Which change would not make an electromagnet stronger? [1]
 - a. more turns of wire
 - b. a larger current
 - c. a soft iron core
 - d. reversing the direction of the current

[3]

Write very short answers to the following questions.

- a. What is the frequency of the a.c. supply in Nepal? [1]
-
-
- b. What is the frequency of direct current? [1]
-
-
- c. Write one advantage of an electromagnet over a permanent magnet. [1]

[8]

Write short answers to the following questions.

- a. Write any two differences between a.c. and d.c. [2]



- b. Give a reason: a ceiling fan connected to the circuit of a solar panel does not turn. [2]

- c. Explain the following rules. [2]

- i. Maxwell's right-hand thumb rule, for the direction of the magnetic field around a straight current-carrying wire.
- ii. Maxwell's right-hand grip rule, for the direction of the field lines around a solenoid.

- d. Give a reason: an electromagnet is used in an electric bell. [2]

6 Long answer [4]

Write a long answer to the following question.

Look at the drawing of the d.c. motor in section 2.

- i. What is the motor effect?
- ii. Why does the coil turn when a current flows in it?
- iii. What is the job of the split-ring commutator?
- iv. Write two ways to make the motor turn faster.



[4]

a. The a.c. supply in Nepal has a frequency of 50 Hz. How long does one cycle take, and how many times does the current change direction in one second?

[2]

Answer:

[2]

[illegible]

Answer:

[2]

A long straight wire is laid north-south on a table, and a compass is placed just above it. When a current flows in the wire, the needle turns towards the east. What happens to the needle if (i) the current is reversed, (ii) the current is switched off? Explain.

(not marked)

Wind about a meter of thin insulated wire round a marker pen to make a coil, scrape the insulation off its ends, and connect them to a 9 V battery for a moment at a time. Bring a compass to each end of the coil, then swap the battery's connections and do it again.

	Pole of the needle attracted to the right end	Pole of the needle attracted to the left end	Poles of the coil (right end, left end)
before swapping the battery			
after swapping the battery			

