

SCIENCE • CLASS 10

CHAPTER 12

Magnetic Effects of Electric Current

NCERT SOLUTIONS



MAGNETIC FIELDS AND THEIR SOURCES

Exercise 1 — What describes the magnetic field near a long straight current-carrying wire?

- (a) Straight lines perpendicular to the wire
- (b) Straight lines parallel to the wire
- (c) Radial lines starting from the wire
- (d) Concentric circles centred on the wire

Answer: (d) Concentric circles centred on the wire.

Exercise 4 — List two methods of producing magnetic fields.

1. Use a permanent magnet.
2. Pass electric current through a conductor or coil.

SHORT CIRCUITS

Exercise 2

At the time of a short circuit, the current:

- | | |
|---------------------------|-------------------------|
| (a) Reduces substantially | (b) Does not change |
| (c) Increases heavily | (d) Varies continuously |

Answer: (c) Increases heavily.

Exercise 8

When does an electric short circuit occur?

A short circuit occurs when a very low-resistance path connects points at different potentials, such as direct contact between live and neutral wires. Damaged insulation or an appliance fault can cause this contact. The very large current can overheat wires; a properly rated fuse or circuit breaker helps interrupt the supply.

A short circuit is different from overloading by too many appliances.

COIL FIELD AND EARTH-WIRE COLOUR

Exercise 3 — State whether each statement is true or false.

- (a) The field at the centre of a long circular coil carrying current consists of parallel straight lines.

Answer: True in the intended long-coil sense.

Near the centre of a long solenoid, field lines are nearly parallel, indicating an approximately uniform field. This does not mean the field is uniform everywhere outside it.

- (b) A wire with green insulation is usually the live wire.

Answer: False.

In the chapter's colour convention, green indicates protective earth, not live. Do not identify a real live wire by colour alone.

MAGNETIC FORCE AND LEFT-HAND RULE

Exercise 5 — When is the force on a current-carrying conductor in a magnetic field largest?

Answer: When current is perpendicular to the field, at 90° , with other factors unchanged.

Exercise 7(ii) — State the rule for finding the force direction on a current-carrying straight conductor perpendicular to a magnetic field.

Fleming's left-hand rule

Stretch the thumb, forefinger and middle finger of the left hand mutually perpendicular.

Forefinger $\rightarrow$ magnetic field

Middle finger $\rightarrow$ conventional current

Thumb $\rightarrow$ force or motion of the conductor



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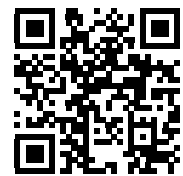


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