GRADE 10 – WORKSHEET

Chapter: Magnetic Effects of Electric Current

A. Multiple Choice Questions (MCQs)

1. The magnetic field inside a long, straight solenoid carrying current is:
   a) Zero
   b) Strong and uniform
   c) Weak and non-uniform
   d) Strong but non-uniform
2. The direction of force on a current-carrying conductor in a magnetic field is given by:
   a) Fleming's Left-Hand Rule
   b) Fleming's Right-Hand Rule
   c) Right-hand thumb rule
   d) Maxwell corkscrew rule
3. When a current flows through a circular loop, the magnetic field at the center of the loop:
   a) Decreases when current increases
   b) Is zero
   c) Increases when radius increases
   d) Is directly proportional to current
4. An electric fuse works on the principle of:
   a) Heating effect of current
   b) Magnetic effect of current
   c) Chemical effect of current
   d) Induced current
5. The magnetic field lines:
   a) Intersect each other
   b) Always move from South to North pole outside the magnet
   c) Form closed continuous curves
   d) Are straight lines
6. An electromagnet becomes stronger when:
   a) The number of turns is decreased
   b) The iron core is removed
   c) Current is increased
   d) Resistance is increased

B. Very Short Answer Questions (1–2 Marks)

1. State one property of magnetic field lines.
2. What is an electromagnet?
3. Define Fleming's Left-Hand Rule.
4. What happens to the magnetic field strength when the current in a solenoid is doubled?
5. Name the factors affecting the force on a current-carrying conductor in a magnetic field.

C. Short Answer Questions (3 Marks)

1. Draw the magnetic field pattern around a straight current-carrying conductor.
2. Explain how a solenoid behaves like a bar magnet. Mention any two similarities.
3. What is the right-hand thumb rule? Give an example where it is used.
4. Distinguish between permanent magnets and electromagnets (any three points).
5. Why is a fuse wire made of alloy of tin and lead?

D. Long Answer Questions (5 Marks)

1. Explain the domestic electric circuit with the help of a neat diagram.
2. What are magnetic field lines? List their properties and describe an activity to show the pattern of field lines around a bar magnet.

F. HOTS (Higher Order Thinking Skills) Questions

1. Why does a current-carrying conductor experience force only when placed perpendicular to the magnetic field? What happens when it is parallel?
2. A student tries to increase the strength of an electromagnet by increasing current, but the iron core becomes hot. Explain why this happens and how it can be prevented.
3. Why do we use soft iron cores instead of steel in electric motor?
4. You have to design an electromagnet that lifts 50 kg of iron. What factors will you consider? Explain scientifically.
5. A beta (β^-) particle is moving vertically upward in a magnetic field directed from south to north. In which direction will the particle be deflected?

G. Diagram-Based Questions

1. Given the diagram of a solenoid, mark the North and South poles.
2. Draw the magnetic field pattern between two like poles.
3. Draw the magnetic field around a bar magnet showing at least 8 field lines.

H. Difficult / Application-Based Questions

1. A magnetic compass shows deflection near a current-carrying wire but not near a wire with AC current. Explain why.
2. Why is it dangerous to touch an overheated fuse wire? Explain the physics behind overheating in relation to resistance and heating effect.
3. A student suggests increasing the number of turns in an electromagnet indefinitely to make it stronger. Why is this impractical?
4. A charged particle moves with velocity perpendicular to a magnetic field. Explain its trajectory and the factors affecting its radius.