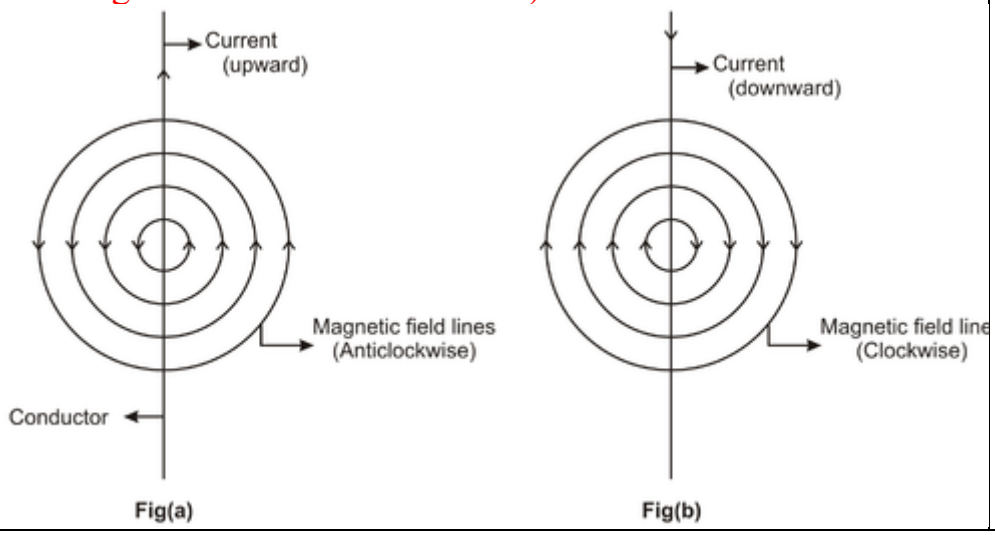
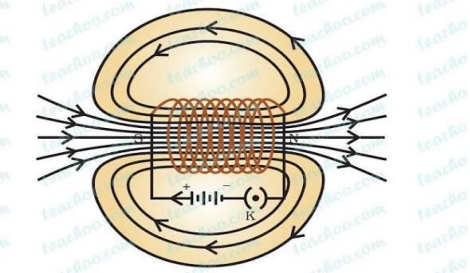
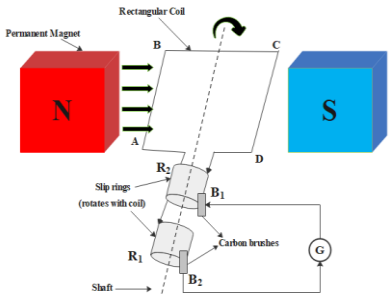
Class 10– CBSE–Science– Chapter – Magnetism

Max Marks – 20 Time: 40 minutes

S.No.	Questions/Problems	Marks
1.	The magnetic field lines inside a current-carrying solenoid are: (a) Circular and do not intersect (b) Straight and parallel to the axis of the solenoid Answer (c) Concentric circles (d) Elliptical in shape	1
2.	Assertion (A): The strength of the magnetic field at the center of a circular coil is inversely proportional to its radius. Reason (R): The magnetic field at the center of a circular coil is given by B= $\frac{\mu 0 I}{2r}$, where r is the radius. (a) Both A and R are true, and R is the correct explanation of A. Answer (b) Both A and R are true, but R is not the correct explanation of A. (c) A is true, but R is false. (d) A is false, but R is true.	1
3.	Draw the magnetic field lines around a straight current-carrying conductor. How does the strength of the magnetic field change if the current through the conductor is doubled? Ans : Diagram: Concentric circles centered on the wire (arrows showing direction based on current).  	2

	Strength change: The magnetic field strength doubles when the current is doubled (since B∝I).	
4.	State Fleming's left-hand rule. With the help of a labeled diagram, explain the working of an electric motor. Ans : Fleming's left-hand rule: Stretch the thumb, forefinger, and middle finger of the left hand mutually perpendicular. If the forefinger points in the direction of the magnetic field and the middle finger in the direction of current, the thumb points in the direction of force/motion. Working of electric motor: • Current flows through coil ABCD in a magnetic field. • Fleming's left-hand rule applies: Forces on AB and CD are equal and opposite, causing rotation. • Split-ring commutator reverses current direction every half-rotation, ensuring continuous rotation. Diagram:	2
5.	(a) What is an electromagnet? List two of its uses. (b) State the purpose of soft iron core used in making an electromagnet. © Mention two ways by which the strength of an electromagnet can be increased. Ans: • **Definition:** An electromagnet is a magnet created when electric current flows through a coil of wire, usually wrapped around a core, producing a temporary magnetic field. • **Uses:** 1. **Electric Motors & Generators:** Used to create rotational motion. 2. **Lifting Magnets (Cranes):** Used in scrapyards to lift heavy iron/steel. **(b)** The soft iron core concentrates and intensifies the magnetic field produced by the coil, significantly strengthening the electromagnet. Soft iron is used because it can be easily magnetized and demagnetized. **(c) Increase the current:** More current flowing through the coil creates a stronger magnetic field. **Increase the number of turns:** More loops (turns) of wire in the coil produce a stronger electromagnet.	3

6.	(a) What is a solenoid? Draw the magnetic field lines around a current-carrying solenoid. (b) Write two ways to increase the strength of the magnetic field produced by a solenoid. Ans : (a) Solenoid: A coil of many turns of insulated copper wire wrapped in a cylindrical shape. Diagram: **Magnetic Field in a Solenoid**  (Field lines: Straight and parallel inside, curved outside; N and S poles at ends.) (b) Two ways: (i) Increase the current through the solenoid. (ii) Increase the number of turns per unit length.	3
7.	(a) Explain the principle of an electric generator. (b) Draw a labeled diagram of an AC generator. (c) Write two differences between AC and DC generators. Ans : (a) Principle: Electromagnetic induction. When a coil rotates in a magnetic field, magnetic flux changes, inducing EMF. (b) Diagram of AC generator:  (Labels: Magnet poles (N/S), rectangular coil, slip rings, brushes, galvanometer/load.) (c) Differences: AC Generator | DC Generator	4

Uses slip rings.	Uses split-ring commutator.	
Produces alternating current.	Produces direct current.	

8. (a) In our houses we receive A C electric power of 220V. In order to draw current from the mains three different coloured wires a used. What are they called? Name them colour wise. (b) What is the potential difference between two of them? (c) What happens in case of an accident due to power leakage? 4

Ans:

(a) Wire Names (Colour-wise)

- **Red:** Live wire (or Phase wire) - Carries the current from the source.
- **Black:** Neutral wire - Completes the circuit, returning current to the source (at near 0V).
- **Green:** Earth wire - A safety wire connected to the ground.

(b) Potential Difference

- The potential difference between the **Red (Live)** and **Black (Neutral)** wires is approximately **220V** (or 220-230V in India/similar regions).

(c) Accident Due to Power Leakage

- If current leaks (e.g., to the metal casing of an appliance), the **Green Earth wire** provides a low-resistance path for this excess current to flow directly to the ground.
- This safely diverts the current away from a person touching the appliance, preventing severe electric shock.
- The large current flow through the earth wire also triggers the fuse or MCB (Miniature Circuit Breaker), cutting off the power supply and making the system safe.