

Sr. No. of Question Paper : 2025

Roll No.....

Unique Paper Code: 2222513602

Name of the Paper: Electricity and Magnetism

Name of the Cours : B.Sc. Prog.–Physical Sciences with Industrial Chemistry NEP: UGCF-2022

Semester: VI- Semester (DSE Paper)

Duration: 2 hours

Max. Marks: 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on the receipt of this question paper.
 2. Attempt all questions.
 3. Each question carry 12 Marks
 4. Use of non-programmable scientific calculator is allowed.
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1.
 - a. What are electric field lines? Explain why electric field lines never intersect.
 - b. Explain hysteresis curve and its uses.
 - c. Discuss the working of a **parallel plate capacitor filled partially/fully with a dielectric.**
 - d. Write statement of Norton theorem with circuit diagram. (3x4)
2. Explain how Gauss' law is used to calculate the electric field: (4x3)
 - a. Due to an infinite line of charge
 - b. Due to an infinite charged plane
 - c. Outside a uniformly charged sphere
3. State and prove Ampere's law. Apply it to calculate magnetic field due to (12)
 - a. a Solenoid and
 - b. a Toroid carrying current

4.

- a. What is the **equation of continuity for electric current**? Derive it from Maxwell's equations.
- b. State **Faraday's laws of electromagnetic induction**. What is the physical meaning of induced emf? (8+4)

5.

(8+4)

- a. State and prove Thevenin's theorem. What are the limitations of this theorem?
- b. What is **Lenz's Law**? How does it ensure conservation of energy?