

AS-2051
ELECTRICITY AND MAGNETISM- C
SEMESTER –II

TIME :3 HOURS

M:M: 30

NOTE : The candidates are required to attempt two question each from Section A&B Carrying 05 marks each and 5 questions from Section C consisting of 7 short answer type questions carrying 2 marks each .

713/MH

SECTION-A

1. Define what is hysteresis? Derive the relation for the loss energy per unit volume per cycle of magnetization.(5)
2. Define magnetic susceptibility and relative permeability of medium. Derive relation between magnetic susceptibility and relative permeability. (5)
3. Starting from the vector statement $\vec{J} = \sigma \vec{E}$ Of Ohm's law, derive the conventional form $V=IR$ of this law. (5)
4. Find the relation between electric fields measured in two different inertial frames of reference. (5)

SECTION-B

5. Prove that the line integral of magnetic field over a closed path enclosing current carrying wire is independent of shape of path.(5)
6. Define self inductance. Derive an expression for self inductance of a solenoid. Why inductance is called electrical inertia? (5)
7. Derive the transformation equations for electric field and magnetic field from one inertial frame of reference to other? (5)
8. State Maxwell's equations for Electric and magnetic field in free space; also explain the physical significance of each. (5)

SECTION-C

9. (5x2)
- (a) What happens to a freely suspended coiled spring, when current is passed through it?
 - (b) Define \vec{M} and \vec{H} . How are they related to free and bound charges?
 - (c) Explain reciprocity theorem of mutual induction.
 - (d) Discuss Ohm's law from atomic point of view.
 - (e) What was the need to modify the relation? $\vec{\nabla} \cdot \vec{B} = \mu_0 \vec{J}$.
 - (f) What are ferrites give their use?
 - (g) What does the area of B-H loop represent? What is the use of this study?