

Roll No.

Total No. of Pages : 02

Total No. of Questions : 07

**B.Sc.(Computer Science) (Sem.-2)**  
**THEORY OF RELATIVITY & ELECTROMAGNETISM**

Subject Code : BCS-203

M.Code : 71508

Date of Examination : 08-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and a student has to attempt any FOUR questions.

**SECTION-A**

**1. Answer briefly :**

- a) What are the postulates of special theory of relativity?
- b) What do you understand by Minkowski space?
- c) The half-life of pion at rest is  $1.78 \times 10^{-8}$  s. What will be its half-life in a beam moving with a speed of  $0.8c$ ?
- d) Which equation shows that the isolated magnetic poles don't exist?
- e) What is the response of conducting medium to electromagnetic waves?
- f) What is Lorentz's force?
- g) Calculate the skin depth for a frequency of  $10^{10}$  Hz for silver. Given that  $\mu = 4\pi \times 10^{-7} \text{ Hm}^{-1}$  and  $CT = 2 \times 10^7 \text{ Sm}^{-1}$ .
- h) State Lenz's law. Is Lenz's law an independent law or contained in Faraday's law.
- i) Discuss the phenomenon of reflection of electromagnetic waves at a boundary for normal incidence.
- j) What is the importance of coupling of electrical circuits?

## SECTION-B

2. Derive Lorentz transformation equations. Prove that Galilean transformations are the limiting case of Lorentz transformation equations.
3. What is Poynting vector? Deduce the expression for the Poynting vector and explain the physical significance of each term.
4. How does mass vary with relativistic velocity? Develop its relation.
5. State and explain Biot-Savart's law. Also, discuss its applications.
6. What do you understand by Mutual inductance? State and prove reciprocity theorem. Also, discuss its applications.
7. What are Maxwell's equations? Explain the concept of Displacement current and show how it led to the modification of Ampere's law.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**