Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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B.Sc.(Computer Science) (2013 & Onwards) (Sem.–2)

THEORY OF RELATIVITY & ELECTROMAGNETISM

Subject Code : BCS-203

M.Code : 71508

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) Why length contraction is not observed in daily life?

(b) A rocket is sent with velocity 0.85c. A light pulse is also sent along the same path. What is the velocity of the light pulse relative to the rocket?

(c) Two photons approach each other, what is their relative velocity?

(d) What is the speed of a particle whose kinetic energy is equal to half of its rest mass energy?

(e) Define poynting vector for E.M. waves.

(f) What force will act on a proton moving parallel to magnetic field?

(g) A current is sent through a hanging coiled spring. What changes do you expect and why?

(h) State Faraday's law of electromagnetic induction.

(i) Define the term magnetic flux. Give the units in which it is measured.

(j) Why inductance is called electrical inertia?

SECTION-B

2. What do you understand by time dilation? On the basis of Lorentz transformation discuss the variation of time with velocity according to special theory of relativity. Explain why a moving clock appears to run slow.

3. Derive the formula for relativistic variation of mass with velocity.

4. Write Maxwell's equations of E.M. theory and hence derive the general wave equation for electric vector and magnetic vector for E.M. waves in a medium with finite permeability and permittivity but no conductivity.

5. Using Biot and Savart's law find the magnetic field at a point on the axis of a circular coil carrying a steady current. Will this field be uniform?

6. Explain the phenomena of Hall effect. How does the Hall effect decide that current in a metallic conductor is due to negatively charged particles? Derive the value of Hall voltage and Hall coefficient.

7. What is a solenoid? Derive an expression for the coefficient of self inductance of a long uniformly wound solenoid.

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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.