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Total No. of Pages : 02

Total No. of Questions : 07

B.Sc.(CS) (2013 & Onwards) (Sem.-1)

ELECTRODYNAMICS

Subject Code : BCS-104

M.Code : 70881

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS 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 students have to attempt any FOUR questions.

SECTION-A**1. Answer briefly :**

- a) Define Curl of a vector field. What is its physical significance?
- b) What do you mean by solenoidal field? Give one example.
- c) Why two electric lines of force do not cross each other?
- d) State Gauss's divergence theorem.
- e) What is differential form of Gauss's law?
- f) Differentiate between current and current density.
- g) What is vector form of Ohm's law?
- h) Why a charge in motion cannot be measured directly by Coulomb's law?
- i) What do you understand by conservation of charge?
- j) Show that diamagnetic susceptibility is independent of temperature.

SECTION-B

2. Derive an expression for the electric field due to an infinitely long uniformly charged straight wire using Coulomb's law.
3. Using Gauss's theorem calculate the electric field due to a uniformly charged non-conducting solid sphere at a point :
 - a) Outside the sphere and
 - b) Inside the sphere.
4. What is a quadrupole? Prove that electric potential at a point due to quadrupole varies as $\frac{1}{r^3}$.
5. From the differential form of Gauss's law, develop the Poisson's and Laplace's equation and Laplacian operator.
6. Derive and discuss the equation of continuity $\vec{\nabla} \cdot \vec{J} = \frac{\partial \rho}{\partial t} = 0$, where \vec{J} is the current density and ρ is the charge density.
7. Find an expression for the field of a point charge moving with uniform velocity. How does it differ from the field due to a stationary charge? Show that the field is not spherically symmetric.

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.