1212-15-509-001

Code No. 8719 / CBCS / NON-CBCS

FACULTY OF SCIENCE

M.Sc. II-Semester Examination, May / June 2016

Subject : Physics and Applied Electronics

Paper - I : Electromagnetic Theory

Time : 3 hours **Max. Marks : 80**

Note : Answer all questions from Part-A and Part-B. Each question carries 4 marks in Part-A and 12 marks in Part-B.

PART – A (8 x 4 = 32 Marks)

(Short Answer Type)

1 Show that electrostatic potential satisfies Poisson's equation.
2 Define scalar and vector magnetic potentials. Give their significance.
3 Using Maxwell's relation div D = ρ , obtain coulombs law.
4 Using Maxwell's equation curl $H = J + \frac{\partial D}{\partial t}$ obtain equation of continuity.
5 Explain the significance of Brewester's angle.
6 For a glass-air interface (n_1 = 1.5 and n_2 = 1.0). Find reflection and transmission coefficients in the case of normal incidence.
7 Derive inhomogeneous wave equation for potentials.
8 What is retarded resistance? Explain.

PART – B (4 x 12 = 48 Marks)

(Essay Answer Type)

9 a) What are the importances of Laplace and Poisson's equations. Formulate the Laplace's equation for electric potential and obtain its solution in spherical co-ordinates.

OR

b) State poynting theorem and discuss in detail how this is used to explain conservation of energy.

10 a) Establish Maxwell's equations for propagation of electromagnetic waves in conducting media and show that inside the conductor magnetic field vector B lags behind electric field vector E.

OR

b) Discuss the propagation of electromagnetic waves in an ideal dielectric medium and obtain an expression for intrinsic impedance of the medium.

11 a) Derive expression for the reflection and transmission coefficients of electromagnetic wave when it is incident at the boundary separating two dielectric media.

OR

b) Discuss the phenomenon of reflection from a metallic surface on the basis of Maxwell's equations for electromagnetic fields.

12 a) Describe the electromagnetic radiation due to an oscillating electric dipole under long wave length approximation in the radiation zone.

OR

b) Derive inhomogeneous wave equation for potentials and hence explain retarded potentials.

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