5th 27

Exam.Code:0935
Sub. Code: 6984

1128

B.E. (Electrical and Electronics Engineering)
Fifth Semester
EE-508: Electromagnetic Fields Theory

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

a) State Coulomb's law.

b) Give the relationship between potential gradient and electric field.

c) What is the complex Poynting vector?

d) What is the significance of displacement current?

e) Write the point form of continuity equation. (5x2)

UNIT – I

II. a) Derive the Stoke's theorem and give one application of the theorem in electromagnetic fields.

b) Transform the vector A = 3i-2j-4k at p(x=2, y=3, z=3) to cylindrical coordinate.

III. a) Obtain the expression for energy stored in magnetic field and also derive an expression for magnetic energy density.

b) State superposition theorem in relevance to field theory and derive the equation for total electric field intensity. (5,5)

IV. a) A uniform cylindrical coil of 2000 turns is 60 m long and 5 cm diameter. If the coil carriers a current of 10 mA, find the magnetic flux density:

i) At the centre of the coil

ii) On the axis at one end of the coil

iii) On the axis half wave between the centre and one end of the coil

P.T.O.

b) Explain 'the following:-

i) Curl

ii) Divergence and

iii) Gradient (6,4)

UNIT – II

V. a) What is Poynting vector? Derive the expression for Poynting theorem.

b) Differentiate between conduction and displacement current and derive the expression for it. (5,5)

VI. State and explain Faraday's law of electromagnetic induction. Hence derive the expressions for statically and dynamically induced emfs. (10)

VII. a) Derive the expression for inductance of a solenoid.

b) Define electrostatic energy and energy density.

c) Derive the relationship between electric field and magnetic field. (4,4,2)

x-x-x