R13

B.Tech II Year II Semester (R13) Regular & Supplementary Examinations May/June 2016
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
  (a)   Give the expressions for Electric field intensity due to volume charge density.
  (b)   State Coulomb's law.
  (c)   What is Polarization?
  (d)   Write the expression for Electric Field Inside a Dielectric Material.
  (e)   State Ampere's circuital Law.
  (f)   Explain about Lorentz force equation.
  (g)   What is magnetic potential?
  (h)   Write the expression of Poisson's Equation.
  (i)   State Poynting theorem.
  (j)   What is meant by skin depth?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   (a)   Derive Maxwell's First equation?
    (b)   Concentrated charges of 0.25 µC are located at the vertices of an equilateral triangle of 10 m side. Find the magnitude and direction of the Force on one charge due to other two charges.
OR
3   (a)   Derive the expression for Potential Due to an Electric Dipole?
    (b)   Derive the expression for Capacitance of a parallel plate Capacitor.

UNIT – II

4   (a)   Derive the expression for Ohm's law in Point form.
    (b)   Explain about different types of polarization in detail
OR
5   (a)   State & explain Continuity Equation?
    (b)   Find the stored energy in static electric field system of four identical charges Q = 5 nC, at the corners 1 m on a side.

UNIT – III

6   (a)   Derive the expression for Torque on a current loop placed in magnetic field.
    (b)   Determine the force per meter length between two long parallel wires A & B separated by 6 cm in air carrying currents of 42 Amps. (i) In same direction. (ii) In the opposite direction.
OR
7   (a)   State and explain Biot-Savart's Law.
    (b)   Obtain the expression for MFI due to a circular Current carrying wire by applying Biot-Savart's Law.

UNIT – IV

8   (a)   Explain about Scalar and Vector magnetic potentials.
    (b)   Obtain the expression for self-inductance of a solenoid?
OR
9   (a)   Derive the expressions for energy stored in magnetic field?
    (b)   Explain Neumann's formula?

UNIT – V

10   Explain about the motion of uniform plane wave in free space and Dielectrics with necessary equations.
OR
11 (a)   Explain Faraday's laws of electromagnetic induction in both integral and Point form.
    (b)   Write Modified Maxwell's equations for Time varying fields.

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