

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)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Give the expressions for Electric field intensity due to volume charge density.
 - State Coulomb's law.
 - What is Polarization?
 - Write the expression for Electric Field Inside a Dielectric Material.
 - State Ampere's circuital Law.
 - Explain about Lorentz force equation.
 - What is magnetic potential?
 - Write the expression of Poisson's Equation.
 - State Poynting theorem.
 - 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 $0.25 \mu\text{C}$ 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 $Q = 5 \text{ nC}$, 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
