

B.Tech II Year II Semester (R15) Regular & Supplementary Examinations May/June 2018

ELECTROMAGNETIC FIELDS
(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- State Coulomb's law and its limitations.
 - Define dipole moment.
 - What is meant by polarization?
 - Distinguish between conduction current and displacement current.
 - State Ampere's circuital law.
 - Write the expression for torque on a current loop placed in a magnetic field.
 - Define vector magnetic potential.
 - Distinguish between self and mutual inductance.
 - What is meant by dynamically induced e.m.f?
 - What is the significance of intrinsic impedance?

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

- 2 A circular disc of radius 'a' m is charged uniformly with a charge-density of ' σ ' coulomb/m². Find the electric field intensity at a point 'h' m from the disc along its axis.

OR

- 3 Four positive point charges 10⁻⁹ coulomb each are situated in x-y plane at points (0, 0), (0, 1), (1, 1) and (1, 0) m. Find the electric field and potential at ($\frac{1}{2}$, $\frac{1}{2}$).

UNIT – II

- 4 State and derive the boundary conditions at the charge interface of two dielectric media.

OR

- 5 Deduce an expression for the capacitance of a parallel plate capacitor having two dielectric media.

UNIT – III

- 6 State and explain Biot-Savart's law. Also obtain the torque developed in a current carrying coil placed in a magnetic field.

OR

- 7 Find an expression for \vec{H} (field-intensity) at the centre of a circular wire carrying a current (I) in the anti-clockwise direction. The radius of the circle is 'a' and the wire is in XY plane.

UNIT – IV

- 8 Discuss about scalar and vector magnetic potentials with relevant expressions. Also state their properties.

OR

- 9 Two coils with negligible resistance and of self-inductance of 0.2H and 0.1H respectively are connected in series and parallel. If their mutual inductance is 0.1H, determine the effective inductance of their combination in each case.

UNIT – V

- 10 Derive Maxwell's equation in point form and integral form using Faraday's law.

OR

- 11 The electric field intensity of a uniform plane wave in air is 7500 V/m in the Y-direction. The wave is propagating in the X-direction at a frequency of 2×10^9 rad/s.
Find: (i) The wavelength. (ii) The frequency. (iii) The time period. (iv) The amplitude H.
