PVP 14

Code: EC4T4

II B.Tech - II Semester – Regular/Supplementary Examinations – April 2017

ELECTRO MAGNETIC FIELDS AND WAVES
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22

1.

a) Write equations for gradient in Cartesian and Cylindrical coordinate systems.
b) What is the condition for a field to be conservative?
c) Define coulombs law of force and give its equation.
d) What is Amperian path? State Ampere's Law.
e) Write any two maxwell's equations in point form.
f) Write any two differences between dia, para and ferromagnetic materials.
g) Define gauss law and give its equation in integral form.
h) Write Lorentz force equation and explain the terms.
i) Write about inconsistency of amperes circuit law.
j) What are Helmholtz equations?
k) Define uniform plane wave.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Verify Divergence theorem for the vector field $\vec{D} = 2\rho z^2\overrightarrow{a_\rho} + \rho cos^2\emptyset\,\overrightarrow{a_z}$ over the region defined by $0 \le \rho \le 2, -1 \le z \le 1, 0 < \emptyset < 2\pi$ 8 M

b) If the vector field $\vec{T} = (\alpha xy + \beta z^3)\,\overrightarrow{a_x} + (3x^2 - \gamma z)\overrightarrow{a_y} + (3xz^2 - y)\overrightarrow{a_z}$ is irrotational, determine α, β, and γ. Find $\nabla.\vec{T}\ at\ (0,2,0)$ 8 M

3. a) State gauss's law and obtain first Maxwell equation for electromagnetic field. 8 M

b) Obtain the expression for capacitance of 8 M
i) Parallel plate capacitor.
ii) Spherical capacitor.

4. a) State Biot-savart law and obtain expression for magnetic field intensity at a point 'P' due to an infinite line current element. 8 M

b) Explain in detail about magnetic torque and magnetic moment. 8 M

5. a) A 50-V voltage generator at 20 MHz is connected to the plates of an air dielectric parallel-plate capacitor with plate area 2.8cm^2 and separation distance 0.2mm. Find maximum value of Displacement current density and Displacement current. 8 M

b) Derive the boundary conditions for Electric Field for Dielectric air interface. 8 M

6. a) State and prove Poynting Theorem. 8 M

b) Define conducting medium and obtain expression for intrinsic impedance. 8 M