

FACULTY OF ENGINEERING

B.E. 2/4 (EE/Inst.) II-Semester (Main) Examination, May 2013

Subject : **Electro Magnetic Theory**

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part - A and answer any five questions from Part-B.**PART – A (25 Marks)**

1. What is Dot product of vectors? (2)
2. Give the examples for cross product of vectors. (3)
3. Define self and mutual inductance. (3)
4. What is a dipole? (2)
5. Write boundary conditions for normal components. (3)
6. What is convention current density? (2)
7. What is frequency, wavelength and velocity? (3)
8. Define Plane wave. (3)
9. What is EMC? (2)
10. Define Microwave (2)

PART – B (5x10=50 Marks)

- 11.(a) Determine the expression for volume charge density associated with (5)

$$D = \frac{4xy}{z} a_x + \frac{2x^2}{z} a_y - \frac{2x^2y}{z^2} a_z$$
 (b) Derive the capacitance due to two parallel conductors. (5)
- 12.(a) Find the magnetic field intensity at the origin due to a current element (5)

$$IdL = 3\pi(u_x - 2u_y + 3u_z) \mu A \cdot m$$
 at the point p(3, 4, 5) in free space.
 (b) Define LORENTZ force equations and obtain force exerted on a charge Q. (5)
- 13.(a) Define Maxwell's equations in point form for time varying fields. (5)
 (b) Prove $\nabla \times E = \frac{\partial B}{\partial t}$. (5)
- 14.(a) Obtain potential and volume charge density at P(0.5 2.5 1) in free space, given (5)
 potential field is $V = 2x^2 - y^2 - z^2$ v.
 (b) Give the solution of Laplace's equations in two dimensions. (5)
- 15.(a) Define continuity of current and derive continuity equation in point form. (5)
 (b) If the electric field intensity of a traveling electromagnetic wave in air medium is (5)
 1.2 v/m what is the power density?
- 16.(a) Explain sources of EMI in intrasystem and intersystem. (5)
 (b) How to control EMI? (5)
- 17.(a) Obtain the inductance of a coaxial cable. (5)
 (b) Define Dispersion and Attenuation (5)