



Code No. : 5331/S

FACULTY OF ENGINEERING
B.E. 2/4 (ECE) I Semester (Suppl.) Examination, June 2012
ELECTROMAGNETIC THEORY

Time : 3 Hours]

[Max. Marks : 75

Note : Answer all questions from Part A, Answer any five questions from Part B.

PART – A

(25 Marks)

1. State Coulomb's law. 2
2. Write the three types of distribution. 2
3. Write short notes on toroid. 2
4. State uniqueness theorem. 3
5. A charge of $-0.3 \mu\text{C}$ is located at A (25, -30, 15) and second charge of $0.5 \mu\text{C}$ at B (-10, 8, 12) cm. Find E at P(15, 20, 50) cm. 3
6. In a cylindrical co-ordinate system $B = \frac{2}{r} a_\phi$ Tesla. Determine the magnetic flux ϕ crossing the plane surface defined by $0.5 \leq r \leq 2.5$; $0 \leq z \leq 2$. 3
7. What is wave propagation of good dielectric ? 3
8. Write Maxwell equation in sinusoidal variation. 3
9. Define Stoke's theorem. 2
10. State Skin depth. 2

PART – B

(50 Marks)

11. State and prove divergence theorem. 10
12. a) Derive the dielectric-dielectric boundary condition in static electric field. 5
b) Region $Z < 0$ is composed of a uniform dielectric material for which $\epsilon_r = 2.5$ and $\epsilon_r = 4$ region $z > 0$ and $E = -30 a_x + 50 a_y + 70 a_z$ v/m find
i) E_{N1} ii) E_4 iii) Angle D_{N1} . 5



13. a) State the Poisson's equation and solution of Poisson's equation in rectangular co-ordinate system. 5
- b) Evaluate the inductance of solenoid of 2500 turns wounded uniformly over a length of 0.5 m on a cylindrical paper tube 4 cm in diameter the medium is air. 5
14. State and prove poynting theorem. 10
15. An infinite long straight filamentary current I along with z-axis is placed in the rectangular co-ordinate system. Find the magnetic field at point P. 10
16. a) Show that the energy density of electric field. 5
- b) Show that a conductor $\nabla \cdot D = 0$ if Ohm's law and sinusoidal variation are assumed. 5
17. Write short notes :
a) Guass law. 3
b) Electric dipole. 3
c) Continuity equation. 4