

KARPAGAM COLLEGE OF ENGINEERING
(Autonomous)
Coimbatore – 32

END SEMESTER EXAMINATIONS – NOVEMBER 2011

B.E (EEE) - Semester III

07EE304/07EI304 – ELECTROMAGNETIC THEORY

Time: 3 hrs

Max. Marks: 100

PART-A

(15x2 = 30 marks)

Answer ALL questions

1. Give the expression for divergence in all the three co-ordinate systems.
2. What is gradient of a scalar? Mention its properties.
3. What is surface charge density?
4. State Divergence Theorem.
5. Define an electric dipole.
6. State the conditions and applications of Gauss Law.
7. State continuity equation of current. Also give its expression.
8. Give the capacitance of a parallel plate capacitor.
9. Give the expression of Poisson's equation of potential U in spherical co-ordinate system.
10. State Ampere's circuital Law.
11. Give the boundary conditions that \vec{H} or \vec{B} must satisfy at the interface of magnetic media.
12. Justify that static magnetic field is solenoidal.
13. What do you understand by displacement current?
14. Give the wave equation of a wave in a perfect dielectric medium with $T = 0$.
15. What is skin effect?

PART - B

(5x14 = 70 marks)

Answer any FIVE questions

16. Derive an expression of electric field intensity for the following charge distributions.
 - i) Line Charge
 - ii) Surface Charge(7+7)
17. i) Derive the expression for energy density in electrostatic field. (6)
 ii) The potential field in free space is given by $V = 50/r$, $a \leq r \leq b$ (spherical).
 I) Show that $\rho_v = 0$ for $a \leq r \leq b$ II) Find the energy stored in the region $a \leq r \leq b$ (8)
18. i) Deduce an expression for the capacitance of a parallel plate capacitor with two dielectrics of relative permittivities ϵ_1 and ϵ_2 respectively interposed between the plates. (10)
 ii) Derive the expression for energy stored in a capacitor. (4)
19. i) Derive an expression for capacitance between two parallel wires. (10)
 ii) Calculate the capacitance per KM between a pair of parallel wires each of diameter 1 cm at a spacing of 50 cm. (4)
20. Derive an expression for the inductance of solenoid and toroid. (14)
21. State and prove Poynting Theorem. (14)
