ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : DECEMBER 2009

REGULATIONS : 2007

THIRD SEMESTER : ELECTRONICS & COMMUNICATION ENGG.

070280012 - ELECTROMAGNETIC FIELDS

TIME : 3 Hours Max. Marks : 100

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. Define scalar product of two vectors A & B.
2. State Gauss's law.
3. State Coulomb's law.
4. Write an expression for divergence of a rectangular co-ordinate system.
5. State Biot-Savart's law.
6. Write the Lorentz force equation for a moving charge.
7. State Ampere's circuital law.
8. Define magnetic vector potential.
9. State point form of Ohm's law.
10. Give examples of ferrimagnetic and ferromagnetic materials.
11. Describe the nature dielectric materials.
12. List the magnetic boundary conditions.
13. State Maxwell's equation in integral form for free space.
14. Define convection current density.
15. What is the significance of Poynting's theorem?
16. State Faraday's law.
17. Define intrinsic impedance.
18. Calculate the depth penetration of copper (conductivity = 5.8×10^7 mhos/meter) at 100 MHz.
19. Define Brewster angle.

20. Define loss tangent

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. Derive the electric field intensity equation of a uniformly charged circular disc.

22. a. Derive the relationship between potential and electric field. 8

b. Define curl and divergence. 4

23. Derive the magnetic field intensity on the axis of circular loop carrying a current I.

24. A solenoid consisting of 1000 turns of wire wounded on a former of length 100cm and diameter 3cm is placed co-axially within another solenoid of the same length and the number of turns but diameter 6cm. Calculate the coupling coefficient and the mutual inductance.

25. Derive the Maxwell's equation in point form and explain its significance.

26. a. What are the general statements about boundary conditions? 6

b. Write down the boundary conditions of between a dielectric (medium 1) and a perfect conductor (medium 2) for time varying case. 6

27. Derive the electromagnetic wave equation in free space.

28 Define polarization. Explain the various types of polarizations in detail.