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B.E./B.Tech(Full Time) DEGREE END SEMESTER EXAMINATIONS APRIL/MAY 2011
COLLEGE OF ENGINEERING GUINDY CAMPUS, ANNA UNIVERISTY, CHENNAI
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH
THIRD Semester
EE 274 Electro Magnetic Theory
(Regulations 2004)

Time: 3 Hours **Max. Marks: 100**

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. What is the significance of using different coordinate systems in field theory?
2. Define Stoke's theorem?
3. Find the force on a charge Q_2=20μC at point (2, 0, 0) by a charge Q_1=30 μC. at point (1, 1, 0) in free space. Dimensions are in meters.
4. Define dipole and dipole moment.
5. Two current carrying wires carry I_1 and I_2 in (a) the same direction (b) in opposite direction. Determine the force between them assuming a separation'd'.
6. What is the field due to a toroid and solenoid?
7. A conductor of 1m length is dragged with a velocity of 100 m/sec. perpendicular to a field, of 1 T. What is the value of the emf induced?
8. Compare the different types of magnetic materials?
9. What is the importance of skin depth in conductors?
10. Draw magnetic flux lines when a solid sphere with μ_r = 1000 is immersed in a uniform magnetic field in space. ?

PART – B (5 x 16 = 80 Marks)

11. Determine the electric field intensity of an infinitely long straight line charge of an uniform density ρ_l in air..

12.a Determine the magnetic flux density both inside and outside an infinitely long, straight conductor with a circular cross-section of radius 'a' carrying a steady current I. Plot the variation of the flux density with radial distance..

(OR)

12 b. Show that the field strength at the end of a long solenoid is one half of that the centre

13. a Starting from the fundamental laws derive a set of Maxwell's equation in both integral and point forms for a conducting medium

(OR)

13. b. State and derive the boundary conditions of time varying fields at the interface between two dielectric media and between a dielectric medium and a perfect metal.

14. a Derive the wave equation in a lossless medium and determine the propagation constants.

(OR)

14. b(i) State Poynting theorem and derive an expression for Poynting vector.

(ii) Derive an expression for magnetic vector potential. (8+8)

15. a. By using the separation of variable method find potential at any point in the space between the centre and outer conductors of an air filled infinite coaxial line is absence of any charge. The centre conductor is at potential V1 and the outer at a zero potential.

(OR)

15. b. Describe FDM solution to Poisson's equation to find potential inside a rectangular trough. Describe the limitation of the method.