B.E. (Full Time) DEGREE END SEMESTER EXAMINATIONS APRIL/MAY.2014
COLLEGE OF ENGINEERING GUINDY CAMPUS,ANNA UNIVERISTY,CHENNAI

BRANCH : ELECTRICAL AND ELECTRONICS ENGINEERING
Third Semester
EE 9202 Electromagnetic Theory
(Regulations 2008)

Time: 3 Hours Answer ALL questions **Max. Marks: 100**

PART – A (10 x 2 = 20 Marks)

1. Give four applications of electromagnetic fields.
2. Give the Cartesian co-ordinates of a point where cylindrical are p = 1, $\phi = 45°$, Z=2.
3. Find the electric potential at a point (4,3) m due to a charge of 10^{-9}C located at the origin in free space.
4. A uniform spherical volume charge distribution, contains a total charge of 10^{-8}C. If the radius of the spherical volume is 2×10^{-2}m. Find ρ_v.
5. Give two examples for diamagnetic and ferromagnetic materials.
6. Define magnetic scalar potential.
7. What is the practical significance of Lenz's Law?
8. Distinguish conduction current and displacement current densities.
9. What is the skin depth of a 3mm radius aluminium round conductor operating at 100Hz and 5MHz the conductively of aluminium is 3.55×10^{-7} S/m.
10. State the condition for high loss medium.

PART – B (5 x 16 = 80 Marks)

11. Obtain an expression for electric field intensity and potential at any point due to a charged circular disc. **(16)**

12. a. (i) Using divergence theorem obtain the differential form of continuity equation. **(6)**

    (ii) State and prove electro static boundary conditions. **(10)**

    (OR)

    b. (i) State and prove Stokes theorem. **(8)**

    (ii) For a vector field $\bar{A}$, show explicitly that $\nabla . \nabla \times \bar{A} = 0$ that is the divergence of the curl of any vector is zero. **(8)**

    (OR)

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13. a. Derive the magnetic field intensity and magnetic flux density at any point along the axis of solenoid. **(16)**

(OR)

b. (i) Obtain an expression for force between two current carrying conductors. **(8)**
(ii) Obtain an expression for vector magnetic potential. **(8)**

14. a. (i) An air co-axial transmission line has a solid inner conductor of radius 'a' and a very their outer conductor of inner radius 'b'. Determine the inductance per unit length of line. **(12)**
(ii) Obtain the continuity equation from field theory concept. **(4)**

(OR)

b. Obtain a set of Maxwell's equation along with solution for free space using basic laws. **(16)**

15. a. Obtain the electromagnetic wave equation for free space in terms of magnetic field and explain the wave propagation with necessary parameters. **(16)**

(OR)

b. (i) Derive Poynting theorem and explain in detail its practical significance. **(10)**
(ii) Determine the reflection co-efficient of oblique incidence in perfect dielectric for parallel polarization. **(6)**