KARPAGAM COLLEGE OF ENGINEERING
(Autonomous)
Coimbatore – 32
END SEMESTER EXAMINATIONS – APRIL 2012
B.E (EEE) - Semester IV
10E402 – ELECTROMAGNETIC THEORY

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

Answer ALL questions
PART- A   (10x2 = 20 marks)

1.   Find the dot product of the vectors if $\vec{A} = 2\vec{a}_x - 3\vec{a}_y$ and $\vec{B} = -\vec{a}_x + 2\vec{a}_z$.

2.   A uniform line charge, infinite in extent , $\rho\ell$= 20 N/m lines along the Z axis. Find Electric field intensity at (6,8,3) m.

3.   State Gauss's Law.

4.   What is an electric dipole?

5.   State the boundary conditions at the interface between two perfect dielectrics.

6.   Find the energy stored in a parallel plate capacitor of 0.5m by 1m has a separation of 2 cm and a voltage difference of 10 V.

7.   State Ampere's circuital law.

8.   Calculate the inductance of a solenoid of 200 turns wound tightly on a cylindrical tube of 6 cm diameter. The length of the tube is 60 cm and the solenoid is in air

9.   Define depth of penetration.

10. Give the significance of displacement current.

PART - B   (5x16 = 80 marks)

11. a)   The charge lies on the Circular disc r ≤ 4 m, z = 0 , with density $\rho_s = \dfrac{10^{-4}}{r} c/m^2$.

Determine $\vec{E}$ at r = 0, z = 3m.   (16)
(OR)
   b)   Explain the properties and applications of Dot product.   (16)

12. a)   Describe any two applications of Gauss's law.   (16)
(OR)
   b) i) Derive an expression for potential due to point charge.   (8)
   ii) A point charge Q = 0.4 nC is located at the origin. Obtain the absolute potential of
      A(2,2,3).   (8)

13. a)   Using Laplace's equation, find the capacitance between two concentric spheres with radii a and b, such that b > a if V = 0 at r = b and V = Vo at r = a.   (16)
(OR)
   b) i) Derive a continuity equation of the current in point form.   (8)
   ii) Explain the various properties of Dielectric materials.   (8)

14. a)   Obtain the magnetic field intensity at the centre of a circular loop.   (16)
(OR)
   b)   Define Inductance and Mutual Inductance. Derive an expression for Inductance of a
         Co-axial cable.   (16)

15. a)   From various basic laws, derive a Maxwell equations for static fields.   (16)
(OR)
   b)   What is a Poynting Vector and obtain the average power using Poynting theorem.   (16)