Roll No:

KARPAGAM COLLEGE OF ENGINEERING, COIMBATORE -641032.

BE-ELECTRICAL AND ELECTRONICS ENGINEERING Semester: III

14E304 ELECTROMAGNETIC THEORY

Continuous Internal Assessment: II

Date:09/09/2015 **Time: Two Hours**

Session:AN **Maximum: 50 Marks**

Answer ALL Questions **PART-A** **(10 x 2 = 20)**

A1. State continuity equation of current in point form and integral form.

A2. Define point form of ohms law.

A3. List any two properties of a dielectric material.

A4. Give the value of tangential and normal components of D and E at the boundary between a conductor and a dielectric.

A5. State uniqueness theorem.

A6. Define curl and list any two properties of curl.

A7. State Amperes circuit law and point form of Amperes law.

A8. Define self inductance and mutual inductance.

A9. If a coil of 800 μH is magnetically coupled to another coil of 200 μH. The co-efficient of coupling between two coils is 0.05. Calculate inductance if two coils are connected in series aiding fashion.

A10. What is meant by magnetic torque and magnetic dipole

Answer ALL Questions **PART-B** **(2x15 = 30)**

B1. (a) (i) State and derive electric boundary conditions for a dielectric to dielectric medium and a conductor to dielectric medium. (6)

(ii) Derive the expression for energy stored in a capacitor (5)

(iii) Verify that the potential field given below satisfies the Laplaces equation $V = 2x^2 - 3y^2 + z^2$ (4)

(OR)

(b) (i) Derive an expression for the capacitance of a parallel plate capacitor with two dielectrics of relative permittivity ϵ_1 and ϵ_2 respectively interposed between the plates. (6)

(ii) Calculate the capacitance of a conducting sphere of 2cm in diameter, covered with a layer of polyethylene with $\epsilon_r = 2.26$ and 3cm thick. (5)

(iii) Derive Poisson's and Laplace's equation. (4)

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B2. (a) (i) Derive an expression for inductance of a Co-axial cable. (6)

(ii) Derive an expression for magnetic flux intensity and density due to an infinite long conductor using Biot-savarts law. (5)

(iii) A coil of 500 turns is wound on a closed iron ring of mean radius of 10 cm and cross-section area of 3 cm^2. Find the self inductance of the winding if the relative permeability of iron is 800. (4)

(OR)

(b) (i) State and prove strokes theorem. (6)

(ii) Explain Biot-Savarts Law (5)

(iii) Derive an expression for magnetic field intensity at any point on the infinite sheet of current carrying conductor using Amperes circuital law. (4)

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