**Reg. No. \_\_\_\_\_\_\_\_**

**Karunya University**

**(Karunya Institute of Technology and Sciences)**

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination - June 2011**

**Subject Title: ELECTROMAGNETIC FIELDS Time: 3 hours**

**Subject Code: 09EC221 Maximum Marks: 100**

#### **Answer ALL questions**

**PART – A (10 x 1 = 10 MARKS)**

1. Mention the co-ordinates of Cylindrical System.

2. What is Point Charge?

3. Define magnetic moment.

4. List the types of magnetic potentials.

5. Name the unit of Current density.

6. What is the unit of Energy density?

7. Mention any 3 types of Magnetic materials.

8. Write the formula for Total Energy stored in a Steady magnetic field.

9. State Lenz Law.

10. What does the direction of Poynting Vector represent?

**PART – B (5 x 3 = 15 MARKS)**

11. State Coulomb’s Law.

12. State Biot Savarts Law.

13. Derive Poissons and Laplace Equations.

14. Define Inductance and obtain the expression for energy stored in an Inductor.

15. State Faradays’ Laws.

**PART – C (5 x 15 = 75 MARKS)**

16. State and derive the Divergence Theorem.

(OR)

17. State Gauss Law. Determine the variations of field from point to point due to

a. A single spherical shell of charges with radius “R” (7)

b. 2 concentric spherical shells of charge of Radius R1 (inner) and R2(outer). (8)

18. Using Biot Savart’s Law, develop an expression for the Magnetic field at any point on the line through the Centre at a distance “h” from the centre and perpendicular to the plane of a plane circular loop of radius “a” and carrying current I.

(OR)

19. Using Ampere’s Circuital Law, develop an expression for Magnetic field intensity both inside and outside a solid cylindrical conductor of a radius “a” carrying a current I with uniform density. Sketch the variation of field intensity as a function of distance from the conductor axis.

20. Derive the Boundary Conditions for perfect dielectric materials.

(OR)

21. Obtain the Capacitance between Co-axial cable and Capacitance of Coaxial cable with 2 Dielectrics.

[P.T.O]

22. Derive the expression for Magnetic boundary Conditions.

(OR)

23. a. Derive the expressions for the inductance of Solenoid. (7)

b. Obtain the Energy Density in the Magnetic field. (8)

24. State and Prove the Poynting Theorem in integral and point form.

(OR)

25. Obtain Maxwell’s equation from Amperes law, Faradays Law and Gauss Law.