Code No: R21024 **R10** SET - 1

II B. Tech I Semester Supplementary Examinations, Dec - 2015
ELECTRO MAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Obtain the expression for electric field intensity on the axis of a uniformly charged circular disc.
   b) Derive the relation between potential and electric field intensity.

2. a) Derive an expression for electric field intensity due to an electric dipole.
   b) Given the potential filed, V = (50 Sin θ/r) V, in free space, determine whether satisfies Laplace's equation.

3. a) Drive an expression for energy stored and energy density in an Electrostatic field
   b) Derive the boundary conditions at the interface between two perfect dielectrics.

4. Derive the expressions for magnetic field intensity and magnetic flux density due to circular coil.

5. a) i) A very long and thin, straight wire located along the z-axis carries a current I in the Z-axis direction. Find the magnetic field intensity at any point in free space using Ampere's law
   b) Prove the Maxwell's equation from Ampere's law

6. a) An iron ring with a cross sectional area of 3 cm square and mean circumference of 15cm is wound with 250 turns wire carrying a current of 0.3A. A relative permeability of ring is 1500. Calculate the flux established in the ring
   b) Derive an expression for a torque on a closed rectangular loop carrying current 'I'.

7. a) A solenoid is 50 cm long, 2 cm in diameter and contains 1500 turns. The cylindrical core has a diameter of 2 cm and a relative permeability of 75. This is coil is co-axial with a second solenoid, also 50 cm long, but 3 cm diameter and 1200 turns. Calculate 'L' for the inner solenoid and L for the outer solenoid.
   b) Obtain an expression for energy density in inductor

8. a) State and prove poynting theorem.
   b) State Maxwell"s equation for static fields. Explain how they are modified for time varying electric and magnetic fields.
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