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2006 SRM UNIVERSITY
B.TECH III SEMESTER DEGREE EXAMINATIONS
ELECTRO MAGANETIC THEORY
(ELECTRICAL AND ELECTRONICS ENGINEERING)

MAY 2006

TIME:3 HOUR
MARK:100

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ANSWER ALL QUESTIONS

PART-A(10*2=20 MARKS)

- 1.State Divergence theorem.
- 2.Give the expression for energy stored in static electric field.
- 3.Write down the equation of continuity in point form.
- 4.Differentiate conductors and dielectrics.
- 5.Define magnetic field intensity and give its relation with magnetic flux density.
- 6.Write down Maxwell's equation for steady magnetic field .
- 7.What are the classes of materials having strong atomic moments?
- 8.Give the magnetic boundary conditions.
- 9.State pointing theorem.
- 10.Write down Maxwell's equation corresponding to Faraday's law in point form.

PART-B(5*16 = 80MARKS)

- 11.a.Obtain the expression for energy density in an electromagnetic field.
(OR)
- b.i.Find the divergence of A at $P(5,\rho/2,1)$ where $f = rz \sin\theta \mathbf{a}_r + 3rz^2 \cos\theta \mathbf{a}_\theta$.
- ii.Calculate divergence at $P(1,\rho/6,5/3)$ where $f = 2r \cos\theta \mathbf{a}_r + r^{1/2} \mathbf{a}_\theta$.
- 12.a. Give and derive the expression for capacitance coaxial with single and two dielectrics..
(OR)
- b.Current density is given by $J = (1/r) e^{-4} \mathbf{a}_r$ A/m².at $t = 1$ s, calculate total outward current in a cylinder of $r = 5$ m and also find the velocity with which the l moves the arbitrary radius ' r ' (' r ' = radius of cylinder) .
- 13.a.Determine the magnetic flux density B caused by a finite length filament of length ' L ' on the z -axis at a distance ' d ' from the origin.
(OR)
- b.Apply Ampere's circuital Law to the perimeter of a differential surface element and obtain the point form of Ampere's circuital law. -19
- 14.a.Find the maximum torque on an arbitrary charged particle if the charge is 1.602×10^{-19} C, the circular path has a radius of 0.5×10^{-3} m, the angular velocity is 4×10^3 rad/s and $B = 0.4 \times 10^{-3}$ T.
(OR)
- b.An air core toroid has 500 turns, a cross sectional area of 6 cm^2 , a mean radius of 15 cm and a coil current of 4A, calculate magnetic field intensity. check your answer by applying Ampere's circuital law.
- 15.a.Derive the Maxwell's equation for steady fields in point form and integral form.
(OR)
- b.State the pointing theorem and derive the expression to prove the pointing theorem.