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No. of Printed Pages—2 EC–401

B. TECH.

FOURTH SEMESTER EXAMINATION, 2003-2004

ELECTROMAGNETIC FIELD THEORY

Time : 3 Hours *Total Marks : 100*

Note : (1) Attempt **ALL** questions **(FIVE)**.
(2) All questions carry equal marks.

1. Attempt any *FOUR* parts of the following :— **(5×4=20)**

(a) Differentiate between Scalar and Vector fields.

(b) What is ∇. Represent the cross product of it with a vector field in spherical coordinate system.

(c) Represent the dot product of ∇ with vector field in cylindrical coordinate system.

(d) Give the physical interpretation of gradient, divergence and curl of a vector field.

(e) Discuss the Gauss's law and its application.

(f) Discuss the Stokes' theorem and its application.

2. Attempt any *TWO* parts of the following :— **(10×2=20)**

(a) Discuss the method of images applied to plain boundaries.

(b) Explain the electric flux density and electrostatic energy.

(c) Discuss the solution of Poisson's and Laplace's equation in one dimension.

3. Attempt any *TWO* parts of the following :— (10×2=20)

(*a*) Discuss the boundary condition for electric field.

(*b*) Discuss the boundary condition for magnetic field.

(*c*) Discuss the energy stored in electric and magnetic fields.

4. Attempt any *TWO* parts of the following :— (10×2=20)

(*a*) State and prove Maxwell's equations and give their physical interpretation.

(*b*) Derive the complex Poynting theorem and explain the transmitter and receiver action.

(*c*) Discuss the solution of plane wave equation in conducting and non-conducting media.

5. Attempt any *TWO* parts of the following :— (10×2=20)

(*a*) Discuss the distortion-less transmission line.

(*b*) Discuss impedance matching and $\frac{\lambda}{4}$ transformer.

(*c*) Discuss input and characteristic impedance of a transmission line.