

K 1031

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2004.

Third Semester

Electrical and Electronics Engineering

EE 231 — ELECTROMAGNETIC THEORY

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Electric field intensity.
2. State Gauss Law.
3. State Laplace's equation.
4. What is a solenoidal field?
5. State Ampere's Law.
6. What is the force and its direction on a conductor in + Z axis carrying current I placed in a magnetic field \vec{B} along X axis?
7. Write point form of Maxwell's equation using Faraday's Law.
8. Define Skin depth.
9. What is Poynting Vector?
10. State Faraday's Law.

PART B — (5 × 16 = 80 marks)

11. (i) Explain finite Element method. (8)
- (ii) Derive the conditions at a boundary between two dielectrics in Electric field. (8)

12. (a) State and prove Gauss law. State its applications. (16)

Or

- (b) Derive the expression for the potential at a pt. P , h metres above a circular disc charged to σ_c/m^2 . Hence deduce the potential at the centre of the disc. (16)

13. (a) (i) Derive expression for inductance of a toroid. (10)

- (ii) Evaluate the inductance of a solenoid with 2500 turns wound uniformly over a length of 0.5 m on a cylindrical paper tube 4 cm in dia. The medium is air. (6)

Or

- (b) Determine the force per metre length between two long parallel wires A and B separated by 5 cm in air and carrying current of 40 amps in the same direction. (16)

14. (a) Derive Maxwell's Equation in point form and integral form using Ampere's Law, Faraday's Law and Gauss Law. (16)

Or

- (b) Derive Poynting's theorem. (16)

15. (a) Write short notes on :

- (i) Separation of variables method. (8)

- (ii) Any one application of Gauss Law. (8)

Or

- (b) Write short notes on :

- (i) Finite difference method. (8)

- (ii) Boundary conditions in Magnetic field. (8)