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L 1266

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

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. Mention any two major sources of Electromagnetic fields.
2. State Coulomb's law and its limitation.
3. Derive the Laplace's equation for electrostatic fields.
4. Draw the magnetic flux pattern around a long straight current carrying conductor.
5. Define Lorentz law of force.
6. Explain any one application of Lenz law.
7. Explain skin effect.
8. For a given E and H what is the direction of propagation of electromagnetic wave?
9. Explain the concept of method of images.
10. Mention the different types of numerical methods used to solve EM field problems.

PART B --- (5 × 16 = 80 marks)

11. (a) (i) Define Gauss's and the conditions to apply the same. (4)
- (ii) Using Gauas's law calculate the E due to infinitely large uniformly charged plate. (6)
- (iii) Two such plates are placed parallel to each other. Compute E between and outside the plates when both the plates are charged with the same charge density. (6)

Or

- (b) Explain dielectric polarization.
12. (a) Derive the magnetostatic boundary conditions at the interface two different magnetic media.

Or

- (b) (i) State and explain Ampere's law. (8)
- (ii) Calculate H inside and outside circular conductor with uniform current density. (8)
13. (a) Explain the different methods of emf generation and derive the governing equations.

Or

- (b) Derive the Maxwell's equations from the fundamental laws.
14. (a) Derive the following parameters for the electromagnetic waves in free space, lossless dielectric and in good conductor: Velocity of propagation, propagation constant, intrinsic impedance.

Or

- (b) Derive the electromagnetic wave equations and their solutions.
15. (a) What is meant by conformal transformation? Explain with an example.

Or

- (b) How will you measure the capacitance by the method of images?