

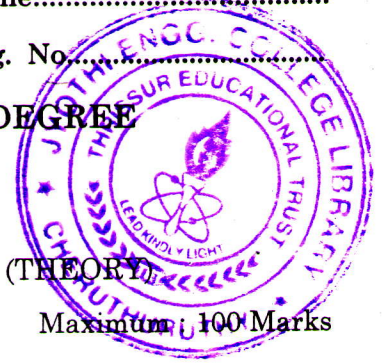
**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, DECEMBER 2007**

Electrical and Electronics Engineering

EE 2K 503/PTEE 2K 304—ELECTROMAGNETIC FIELD (THEORY)

Time : Three Hours

Maximum : 100 Marks



- I. (a) Derive an expression for energy stored in a magnetic field.
 (b) Derive the capacitance of an Isolated sphere. Explain the steps.
 (c) What is a magnetic dipole ? Explain with a sketch.
 (d) Explain the types of transmission lines and their applications.
 (e) What are plane waves, uniform plane waves and plane wave front ? Explain.
 (f) Differentiate Elliptical from circular polarization. Explain their significance.
 (g) Derive standard wave equations from Maxwell's equations.
 (h) Explain the concept of Brewster angle. Obtain an expression for it.

(8 × 5 = 40 marks)

- II. (a) (i) Derive the potential frictions for sinusoidal oscillations. (8 marks)
 (ii) State and derive stokes theorem and divergence theorem. (7 marks)

Or

- (b) (i) Define Dipole. Obtain an expression for the resultant potential and electric field. (8 marks)
 (ii) Explain spherical to Cartesian co-ordinates transformation. Obtain the relation. (7 marks)

- III. (a) (i) Derive an expression for Inductance of solenoid. (8 marks)
 (ii) Derive expressions for conduction current and displacement current densities. (7 marks)

Or

- (b) (i) Derive an expression for Inductance of toroid. (8 marks)
 (ii) Differentiate Self Inductance from Mutual Inductance. (7 marks)

- IV. (a) State and derive poynting theorem. Also derive poynting vector for time varying fields. Explain its applications.

Or

Turn over

- (b) (i) Derive an equation that would describe an ellipse for elliptical polarization. (8 marks)
(ii) Obtain Maxwell's equations in differential form. (7 marks)
- V. (a) (i) Derive the equations of smith chart. (8 marks)
(ii) Explain the potential applications of Smith chart. (7 marks)

Or

- (b) (i) Compare the characteristics of co-axial line with 2 wire transmission line. (8 marks)
(ii) Define and explain the significances of :
- 1 Phase velocity.
 - 2 Group velocity.
 - 3 Characteristic Impedance.

(7 marks)

[4 × 15 = 60 marks]