D 27191 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION DECEMBER 2006

EE 2K 503/PT EE 2K 304—ELECTROMAGNETIC FIELD THEORY

Time : Three Hours Maximum : 100 Marks

I. (a) Obtain an expression for the capacitance of an isolated sphere.

(b) Obtain the solution of Laplace's equation in electrostatistics.

(c) Differentiate electric dipole from magnetic dipole.

(d) Enumerate the characteristics of an ideal transmission line.

(e) Obtain Maxwell's equations in time varying form. Also write the constitutive relations.

(f) Explain the significance of polarization in field theory.

(g) Obtain the relation between standing wave Ratio and reflection co-efficient.

(h) State and derive Snell's law of refraction.

(8 × 5 = 40 marks)

II. (a) (i) Explain cylindrical to spherical co-ordinate transformation. Obtain the transformation equations. (8 marks)

(ii) Explain the principle of method of Images. (7 marks)

Or

(b) (i) Derive expressions for energy stored in electric and magnetic fields. (8 marks)

(ii) State and derive Stokes theorem and Divergence theorem. (7 marks)

III. (a) (i) Derive expressions for Inductance solenoid and toroid. (8 marks)

(ii) State and explain Biot-Savort's law and Ampere's law. (7 marks)

Or

(b) (i) State and derive Faraday's law of electromagnetic induction. (8 marks)

(ii) Explain the characteristics of an ideal transmission line. (7 marks)

IV. (a) (i) Explain the significance of poynting theorem. Derive an expression for poynting vector. (8 marks)

(ii) Differentiate Elliptical polarization from circular polarization. (7 marks)

Or

(b) (i) Derive standard wave equations. (8 marks)

(ii) Obtain Maxwell's equations in Integral term. (7 marks)

Turn over

V. (a) (i) Explain the principle of single stub and double stub matching with neat sketches. (8 marks)

(ii) Derive the equation of Smith chart. (7 marks)

Or

(b) (i) Derive the standard transmission line equations. (8 marks)

(ii) Explain the concept of Brewster's angle. Obtain an expression for Brewster angle. (7 marks)

[4 × 15 = 60 marks]