D 51556 EE

Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2008

EE 2K 503/PTEE 2K 304 – ELECTROMAGNETIC FIELD THEORY

Time : Three Hours

Maximum : 100 Marks

I. (a) State Stoke's theorem. Give example.

(b) Find the potential inside and outside a spherical shell of radius R which carries a uniform surface charge.

(c) Prove that magnetic forces do not work.

(d) State Biot-Savant's law.

(e) Write short notes on circular polarization.

(f) Derive the wave equations in vacuum.

(g) Write the applications of Smith chart.

(h) Write the law of reflection.

(8 × 5 = 40 marks)

II. (a) Explain the principle of method of images. Give an example to image problem and solve it.

Or

(b) Discuss the solutions of Laplace's equation in one, two and three dimensions.

III. (a) A short solenoid (length l and radius a, with n_1 turns per unit length) lies on the axis of a very long solenoid (radius b, n_2 turns per unit length). Current I flows in the short solenoid. What is the flux through the long solenoid? Also find the mutual inductance.

Or

(b) Discuss the Faraday's experiments related to electromagnetic induction.

IV. (a) Derive Maxwells' equations.

Or

(b) Derive the wave equations in conductors.

V. (a) Derive Brewster's angle.

Or

(b) Define the terms : (i) Group velocity ; (ii) Characteristic impedance ; (iii) SWR.

(4 × 15 = 60 marks)