D 51541

Name.....

Reg. No.....

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

EC 2K 502/PTEC 2K 501—ELECTROMAGNETIC FIELD THEORY

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

I. (a) Explain how Cartesian co-ordinates are changed to spherical polar co-ordinates.

(b) Find the electric field outside a uniformly charged solid sphere of radius R and total charge q.

(c) Find the magnetic field a distance s from a long straight wire carrying a steady current I.

(d) What is meant by motional e.m.f. ?

(e) Give divergence and curl of electric field and magnetic field before Maxwell.

(f) Write short notes on wave polarization.

(g) Give the applications of Smith chart.

(h) Write short notes on impedance matching.

(8 × 5 = 40 marks)

II. (a) Derive the expression energy stored in electric field. (15 marks)

Or

(b) Derive the electrostatic boundary conditions. (15 marks)

III. (a) Discuss the theory of self and mutual inductances. (15 marks)

Or

(b) Explain the Faraday's law of electromagnetic induction with the help of Faraday's experiments. (15 marks)

IV. (a) State and prove Poynting's theorem. (15 marks)

Or

(b) Derive the wave equations for conducting medium. (15 marks)

V. (a) Discuss the wave incidence normally on a perfect conductor. (15 marks)

Or

(b) (i) Derive the wave equation on transmission lines. (7 marks)

(ii) Write short notes on phase velocity and group velocity. (8 marks)

[4 × 15 = 60 marks]