

2006 COCHIN UNIVERSITY OF SCIENCE & TECHNOLOGY

B.TECH ELECTRONICS & COMMUNICATION ENGINEERING ELECTROMAGNETIC THEORY

NOVEMBER 2006

TIME: 3 HOUR
MARK: 90

ANSWER ANY SIX QUESTION
ALL QUESTIONS CARRY EQUAL MARKS

MARK [6*15]

- 1 a. Explain the transformation from Cartesian to Cylindrical coordinate system
- b. Explain the term divergence. State and prove divergence theorem
- 2 a. Explain Coulomb's law and Gauss's law
- b. Derive the expression for energy stored in a capacitor
- 3 a. State and explain Biot-Sawart Law
- b. A wire carrying a current of 100A is bent into a square of side 10cm. Calculate the field at the centre of the coil
- 4 a. State and explain Ampere's Circuital Law
- b. Derive the expression for the 'inductance of a co-axial cable
- 5 a. State and explain Faraday's Laws of Electromagnetic induction
- b. Explain displacement current and eddy current
- c. Differentiate between self and mutual inductances
- 6 a. Explain the Maxwells equations in integral and point forms
- b. Explain the following terms:
 - i) Phase velocity and group velocity
 - ii) Skin depth
- 7 a. State and explain Poynting Theorem
- b. Explain :
 - i) Snell's law
 - ii) Brewster angle
 - iii) Wave impedance
- 8 a. Derive the expression for reflection coefficient and transmission coefficient for a normally incident wave having parallel polarization
- b. Explain Evanescent wave concept
- 9 a. Derive transmission line equations
- b. What is standing wave? Define standing wave ratio. What is its relationship with reflection coefficient?
- 10 a. Explain the following for a rectangular wave guide:
 - i) Cut off wave length
 - ii) Dominant mode
- b. Explain :
 - i) Stub matching
 - ii) Quarter wave length and half wave length transformer matching