

Exam.Code:0928
Sub. Code: 6244

1048
B.E. (Electronics and Communication Engineering)
Fourth Semester
EC-420: Electromagnetic Theory

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) Discuss the inconsistency defined by Maxwell in Ampere's law.
- b) Define Poynting vector?
- c) Comment and justify. "TEM mode exists in waveguide."
- d) Differentiate group velocity and phase velocity.
- e) What is a Cavity resonator? (5x2)

UNIT - I

- II. a) State and explain Divergence Theorem as applied to an electrostatic field.
b) Discuss the analogies between Electric and Magnetic fields. c. Write down the Maxwell equations in differential form, integral form and for free space. (4,3,3)
- III. a) E and H are mutually perpendicular to each other in uniform plane wave". Justify.
b) Explain the concept of Reflection and transmission of the wave in regard with conductors and dielectrics. (5,5)
- IV. a) What is the "polarization" of the electric field vector of a uniform plane traveling in the z-direction represented by $E = E_0 (x + jy) e^{j\omega t}$. Justify your answer.
b) Derive a relation for intrinsic impedance for conducting medium. (5,5)

UNIT -II

- V. a) Differentiate waveguide and transmission line.
b) Define Standing wave ratio. Derive a relation between SWR and Reflection Coefficient for a transmission line. (5,5)

P.T.O.

(2)

- VI. a) What do you understand by Dominant mode? Explain in context with rectangular and circular waveguide.
- b) Calculate the cut-off frequency for the dominant mode in a rectangular waveguide of dimensions 4cm x 2cm. (5,5)
- VII. a) Differentiate TE and TM mode. Comment. "TEM mode exists in waveguide."
- b) Find the cut-off wavelength in a standard rectangular waveguide for the TE_{11} mode. (4,6)

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