3216

B. Tech. 5th Semester (ECE)
Examination – December, 2022

ELECTROMAGNETIC WAVES

Paper : PCC-ECE-301-G

Time : Three hours] [Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question number 1 is *compulsory*. All questions carry equal marks.

1. Define the following : 2.5 × 6 = 15

   (a) Reflection Coefficient

   (b) VSWR

   (c) Total internal reflection

   (d) Characteristic impedance

   (e) Impedance matching

   (f) Hertz dipole

P. T. O.

SECTION – A

2. (a) Deduce the wave equation for conducting medium.

8

(b) Define and discuss the loss less transmission line. 7

3. Discuss the importance and usage of Smith chart. 15

SECTION – B

4. State and derive the Mexwell's Equations in differential and integral form.

15

5. Discuss the wave propagation in conducting medium. 15

SECTION – C

6. Discuss the concept of plane wave reflection. 15

7. (a) Discuss the TE and TM mode propagation in plane wave guide.

8

(b) Discuss the concept of reflection and refraction in case of dielectric interface.

7

SECTION – D

8. Deduce the expression for power radiated by hertz dipole.

15

9. Define monopole and dipole antenna. Deduce the expression for potential function.

15

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B. Tech. 5th Semester (ECE)
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Note : Attempt *five* questions in all, Selecting *one* question from each Unit. Question No. **1** is *compulsory*. All questions carry equal marks.

1. Write short answer of the following :

   (a) What are Electromagnetic Waves ?

   (b) Define and briefly explain Reflection Coefficient.

   (c) Define Phase Velocity.

   (d) Explain Total Internal Reflection.

   (e) What are Transverse Electromagnetic waves ?

   (f) What is Monopole Antenna ?　　　$2.5 \times 6 = 15$

UNIT – I

2. Give applications of Transmission lines as impedance matching unit and as circuit elements.   15

3. (a) Explain Admittance Smith Chart.   8

   (b) Describe impedance Transformation on lossless and low loss transmission lines.   7

UNIT – II

4. (a) Describe Maxwell's equations.   10

   (b) Write a short note on Wave Polarization.   5

5. (a) Explain Reflection and Refraction at Dielectric Interface.   8

   (b) Describe the principle of Total Internal Reflection.   7

UNIT – III

6. (a) Compare 2-wire Transmission Lines with Waveguides.   7

   (b) Describe Attenuation in relation with Waveguides.   8

7. What are Rectangular Waveguides ? Describe Modal Propagation in Rectangular Waveguides in detail.   15

UNIT – IV

8. Explain the Radiation mechanism from Hertz dipole and also describe power radiated by it. 15

9. Write short notes on any *two* : 8 + 7 = 15

   (a) Receiving Antenna

   (b) Dipole Antenna

   (c) Radiation Parameters of Antenna

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