SNS COLLEGE OF TECHNOLOGY

(*An Autonomous Institution*)

COIMBATORE-35

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

19EET201-Field Theory

Question Bank

UNIT- V

ELECTROMAGNETIC WAVES

PART- A (2 MARKS)

1. Define a Wave.
2. Mention the properties of uniform plane wave.
3. Write down the wave equation for E and H in free space.
4. Write down the wave equation for E and H in a conducting medium
5. Define intrinsic impedance or characteristic impedance.
6. Calculate the characteristic impedance of free space.
7. Define propagation constant.
8. Define skin depth.
9. Define Pointing vector.
10. State Poynting Theorem.
11. What is lossy dielectric medium?
12. For a loss dielectric material having μr=1 , r=48, =20s/m. calculate the Propagation constant at a frequency of 16 GHz.
13. Define Polarization.
14. Define Circular Polarization.
15. Define Elliptical polarization.
16. Define Linear Polarization.

PART- B

1. (a) Calculate the attenuation constant and phase constant for the uniform plane wave with the frequency of 10GHz in a medium for which μ=μ0, r=2.3 and =2.54×10-4/m .

1.(b) Derive the expression for the attenuation constant ,phase constant and intrinsic impedance for a uniform plane wave in a good conductor.

2. Derive the one dimensional general wave equation and find the solution for wave equation.
3. Discuss about the plane waves in lossy dielectrics.

4. Discuss about the plane waves in lossless dielectrics.

5. Briefly explain about the wave incident

(i) Normally on perfect conductor

(ii) Obliquely to the surface of perfect conductor.

6. (a). Assume that Eland H waves, traveling in free space, are normally Incident on the interface with a perfect dielectric with r=3 .calculate the magnitudes of incident, reflected and transmitted E and H waves at the interface.

(b) A uniform plane wave of 200 MHz, traveling in free space Impinges normally on a large block of material having r =4 , μr =9 and =0. Calculate transmission and reflection co efficient of interface.

7. Derive wave equation in phasor form .

8. Derive suitable relations for integral and point forms of poynting theorem.

9. A plane wave propagating through a medium with r = 8, μr = 2 has E = 0.5 sin (108 t – z) az V/m.

Determine

(i) The loss tangent

(ii) Wave impedance

(iii) Wave velocity

(iv) H field (16)