



B.Tech V Semester Regular/Supplementary Examinations, December 2021
ELECTROMAGNETIC THEORY AND TRANSMISSION LINES
(Electronics and Communication Engineering)

Maximum Marks: 70

Date: 30.12.2021 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 What are the various types of charge distribution?
- 2 Define relaxation time.
- 3 State Ampere's Circuital law.
- 4 Define phase velocity and group velocity.
- 5 Define polarization and mention its types
- 6 Give the formula for Poynting Vector and Poynting Theorem
- 7 List the secondary constants of the transmission line
- 8 What is inductance loading? Give the advantage of it?
- 9 Mention the application of Quarter wave length transmission line
- 10 Write down the expression of Gauss Law in Integral form?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 a) A capacitor consists of two parallel metal plates 30 cm x 30 cm surface area, separated by 5 mm in air. Determine its capacitance. Find the total energy stored by the capacitor and the energy density if the capacitor is charged to a potential difference of 500V? (6M)
b) State and explain coulomb's law and deduce the vector form of force equation between two point charges. (.4M)

OR

- 12 a) Derive the Poisson's and Laplace equation? (7M)
b) Give the Poisson's equation in Cartesian, Cylindrical and Spherical co-ordinate systems (3M)
- 13 Derive the Maxwell's equation from faraday law and ampere law in different final form. (10M)

OR

- 14 Consider the boundary between two media. Show that the angles between the normal to the boundary and the magnetic flux densities on either side of the boundary and magnetic flux densities on either side of the boundary satisfy the relation: $\frac{\tan\theta_1}{\tan\theta_2} = \frac{\mu_1}{\mu_2}$ where μ_1 and μ_2 are the permabilities of the respective media and θ_1 and θ_2 are the angles. (10M)
- 15 a) What is meant by uniform plane wave? (2M)
b) Derive the wave equation for perfect dielectric medium? (8M)

OR

- 16 Explain the propagation of plane wave in Perfect Conductor by both Normal and Oblique Incidences. (10M)
- 17 a) Explain the types of distortion? (4M)
b) Derive the condition for Distortion less in a transmission line. (6M)
- OR
- 18 Derive the voltage and current equation of transmission line? (10M)
- 19 Derive the Input Impedance of a transmission line. Find the relationship between open circuit and short circuit transmission line. (10M)
- OR
- 20 a) Mention the advantages of single stub impedance matching. (3M)
b) Define VSWR and derive expression for VSWR? (7M)