



B.Tech III Year I Semester Supplementary Examinations, December 2024

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES
(ECE)

Maximum Marks: 70

Date: 23.12.2024

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)

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|----|---|
| 1 | State and explain Gauss's law. |
| 2 | Define the capacitance of a spherical capacitor? |
| 3 | State Maxwell's equations for a lossless or non-conducting medium. |
| 4 | State the Ampere's Force Law. |
| 5 | Give an expression for intrinsic impedance in phasor form. |
| 6 | Write the significance of loss tangent. |
| 7 | What are the primary constants of transmission lines. |
| 8 | How does group velocity vary when compared to phase velocity? |
| 9 | What are the two families of circles that constitute the Smith Chart? |
| 10 | What are the advantages and disadvantages of a Single Stub? |

Part-B

Answer All the following questions. (10M X 5=50Marks)

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| 11 | An infinitely long uniform line charge is located at $y=3$, $z=5$. If $\rho_L=30\text{nC/m}$, find field E intensity at (i) origin (ii) P (5, 6, 1). [10M] |
| | OR |
| 12 | Define Electric potential and Derive the relationship between Electric field and Electric potential? [10M] |
| 13 | State and derive expression for Biot-Savart's law. [10M] |
| | OR |
| 14 | Derive Maxwell's equations in integral form. Based on this obtain the corresponding differential equation by applying Stroke's theorem. [10M] |
| 15 | Explain the transformer and motional EMFs? [10M] |
| | OR |
| 16 | State and prove Poynting theorem. [10M] |
| 17 | Discuss in brief about inductance loading of telephone cables. [10M] |
| | OR |

18	Briefly discuss the different types of transmission lines. [10M]
19	What is distortion? State the conditions that characterize a distortion less line. [10M]
	OR
20	Explain the significance and design of single stub impedance matching. Discuss the factors on which stub length depends. [10M]