

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.TechIII Year I Semester Supplementary Examinations June-2024
ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

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|---|---|---|-----|----|----|
| 1 | a | Define Gauss's law. | CO1 | L1 | 2M |
| | b | What is meant by Magnetostatic fields? | CO2 | L1 | 2M |
| | c | Define Transformer EMF. | CO3 | L1 | 2M |
| | d | List wave equation for E and H in free space ? | CO4 | L1 | 2M |
| | e | What is the relationship between characteristic impedance and propagation constant. | CO6 | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|---|---|---|-----|----|----|
| 2 | a | Define Gauss's Law. Apply Gauss's law to evaluate Electric Flux density for a uniformly charged Sphere. | CO3 | L1 | 7M |
| | b | What are the advantages and applications of Gauss law? | CO1 | L1 | 3M |

OR

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|---|--|--|-----|----|-----|
| 3 | | Explain the following with expression.
a) Coloumb's law. b) Electric field intensity. c) Gauss law. | CO2 | L2 | 10M |
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UNIT-II

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| 4 | a | Determine Maxwell's Equations for Magnetostatic Field. | CO3 | L5 | 5M |
| | b | Determine the Magnetic Flux Density due to Infinite Sheet of Current. | CO2 | L5 | 5M |

OR

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| 5 | | Explain any two applications of Ampere's Circuit law. | CO2 | L2 | 10M |
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UNIT-III

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| 6 | a | Prove that one of the Maxwell's equation is $\nabla \times H = J_d + J$. | CO2 | L5 | 5M |
| | b | An antenna radiates in free space and $E = 80 \cos(500t - 8z)ax$ V/m. Calculate ω and β . | CO3 | L3 | 5M |

OR

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|---|---|---|-----|----|----|
| 7 | a | Explain Faraday's law of electromagnetic induction and derive the Expression for Induced EMF. | CO3 | L2 | 6M |
| | b | Explain the motional EMF and derive the expression for the maxwell equation. | CO3 | L2 | 4M |

UNIT-IV

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| 8 | a | Determine the expression for intrinsic impedance and propagation constant in a good conductor. | CO5 | L5 | 6M |
| | b | In a Non-magnetic medium, $E = 4 \sin(2\pi X 107t - 0.8x)ax$ V/m. Find ϵ_r , η . | CO4 | L3 | 4M |

OR

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| 9 | | Evaluate the expressions for reflection coefficient and transmission coefficient by a normal incident wave for a dielectric medium. | CO5 | L5 | 10M |
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UNIT-V

- 10 a Evaluate the equation for Characteristic Impedance of a Transmission line. **CO6 L5 5M**
- b A telephone line has the following parameters: $R = 30 \Omega/\text{km}$, $G = 0$ $L = 100\text{mH}/\text{km}$, $C = 20\mu\text{F}/\text{m}$. At 1kHz, calculate the characteristic impedance, propagation constant and velocity of the signal. **CO6 L3 5M**

OR

- 11 a Explain about the smith chart for finding the SWR and Reflection coefficient. **CO6 L2 7M**
- b List out the applications of smith chart? **CO6 L1 3M**

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