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

B.Tech III Year I Semester Supplementary Examinations December-2021

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. | L1 | 2M |
| | b | What is meant by Magnetostatic fields? | L1 | 2M |
| | c | Define In consistency of Ampere's law | L1 | 2M |
| | d | List wave equation for E and H in free space. | L1 | 2M |
| | e | What are the primary constants of a transmission line? | L1 | 2M |

PART-B

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

UNIT-I

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|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
| 2 | a | Define Coulomb's law and derive the force F that exists between two unlike charges. | L1 | 5M |
| | b | Three Point Charges $Q_1=1$ mc, $Q_2=2$ mc and $Q_3=-3$ mc are respectively located at (0,0,4), (-2,6,1) and (3,-4,-8). Calculate the electric force and electric field on Q1 due to Q2 and Q3. | L3 | 5M |

OR

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|---|---|-------------------------------------------------------------------------------------------------|----|----|
| 3 | a | Define Eclectic Potential. Find the electric potential for a point charge is located at origin. | L1 | 5M |
| | b | Determine the Relationship between E and V. | L5 | 5M |

UNIT-II

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| 4 | Find H for a straight current carrying conductor using Biot Savart's law and Ampere's Circuit law. | L1 | 10M |
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| 5 | Explain any two applications of Ampere's Circuit law. | L2 | 10M |
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UNIT-III

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| 6 | a | Discuss Maxwell's equation in both differential and integral in final form | L6 | 6M |
| | b | An antenna radiates in free space and $H=50\cos(1000t-5y)axA/m$. Calculate ω and β . | L3 | 4M |

OR

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|---|---|------------------------------------------------------------|----|----|
| 7 | a | Determine the Transformer EMF for the time varying fields. | L5 | 7M |
| | b | Define Faraday's law. | L1 | 3M |

UNIT-IV

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|---|---|---------------------------------------------------------------------------------------------------------------------------|----|----|
| 8 | a | Explain and derive the characteristics of wave propagation in free space. | L2 | 6M |
| | b | Given that $E = 40\cos(10^8t - 3x)ay, v/m$ Determine the direction of wave Propagation, velocity of the wave, wavelength. | L3 | 4M |

OR

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| 9 | Explain the followings with an expression. | L2 | 10M |
| | i) Linear polarization ii) Circular polarization iii) Elliptical polarization | | |

UNIT-V

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|----|---|------------------------------------------------------------------------------------|----|----|
| 10 | a | Evaluate the equation for voltage and current at any point in a transmission line. | L5 | 6M |
| | b | Discuss about Transmission line Parameters | L6 | 4M |

OR

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|----|---|-------------------------------------------------|----|----|
| 11 | a | Relate SWR and reflection coefficient. | L2 | 5M |
| | b | Explain the applications of transmission lines. | L2 | 5M |

END