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

B.Tech III Year I Semester Supplementary Examinations August-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 | 2M |
| | b | Define Biot-Savart's law | 2M |
| | c | Define Displacement current. | 2M |
| | d | Define Poynting vector. | 2M |
| | e | What is characteristic impedance? | 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. | 5M |
| | b | Three Point Charges Q1=1 mc, Q2=2 mc and Q3=-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. | 5M |

OR

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|---|---|---|----|
| 3 | a | Evaluate the two Maxwell's equations for electrostatic fields and state them. | 5M |
| | b | List Maxwell equations for electrostatic fields in integral form | 5M |

UNIT-II

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|---|---|---|----|
| 4 | a | Explain Ampere's Circuit Law. | 5M |
| | b | Determine the Magnetic Field Intensity due to a infinite sheet current. | 5M |

OR

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|---|---|---|----|
| 5 | a | Discuss about Magnetic Vector and Scalar Potentials. | 5M |
| | b | Given Magnetic Vector potential $A = -\rho/4 az$ wb/m, Calculate the total magnetic flux crossing the $\Phi = \pi/2, 1 \leq \rho \leq 2m, 0 \leq z \leq 5m$. | 5M |

UNIT-III

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| 6 | a | Determine the Transformer EMF for the time varying fields. | 5M |
| | b | Define Faraday's law? | 5M |

OR

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|---|---|---|----|
| 7 | a | In free space, $E = 20 \cos(\omega t - 50x) ay$ V/m. Calculate Jd, H. | 6M |
| | b | Translate the Maxwell's equations into word statement. | 4M |

UNIT-IV

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|---|---|--|----|
| 8 | a | Evaluate the wave equation in lossy dielectric medium for sinusoidal time variations. | 6M |
| | b | Determine the expression for intrinsic impedance and propagation constant in a good conductor. | 4M |

OR

- 9 Evaluate the expressions for reflection coefficient and transmission coefficient by a normal incident wave for a dielectric medium. **10M**

UNIT-V

- 10 a Explain about Microstrip Transmission Line **5M**
b A distortion less line has $Z_0=60 \Omega$ Attenuation constant = 20 mNp/m and $u=0.6c$ (c is velocity of light) Find the primary parameters of the transmission line($R L C G$ and λ) at 100MHz. **5M**

OR

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

END