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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2021
ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a State Coulomb's law and write the equation of \mathbf{F} that exists between two unlike Charges? 6M
- b Three Point Charges $Q_1=1 \text{ mc}$, $Q_2=2 \text{ mc}$ and $Q_3=-3 \text{ mc}$ are respectively located at $(0,0,4)$, $(-2,6,1)$ and $(3,-4,-8)$. Calculate the Power on Q_1 . 6M

OR

- 2 a Derive the Continuity Equation and Relaxation time for Electrostatic Fields. 6M
- b Explain the Concept of polarization in Dielectrics. 6M

UNIT-II

- 3 a Write about Magnetic Vector and Scalar Potentials. 6M
- b Derive the expression for Magnetic field Intensity Due to a Straight current carrying filamentary conductor of finite length. 6M

OR

- 4 a Explain Ampere's Circuit Law. 6M
- b Determine the Magnetic Field Intensity due to infinitely long coaxial Transmission line. 6M

UNIT-III

- 5 a State and Explain the Faraday's laws in Electromagnetic induction. 6M
- b Show that the Displacement Current Density $\mathbf{J}_D = \frac{\partial \mathbf{D}}{\partial t}$ 6M

OR

- 6 a Write down the Maxwell's Equations in their integral form. Derive the Corresponding Equations for fields varying harmonically with time. 6M
- b Obtain Lorentz's Force equation. 6M

UNIT-IV

- 7 a State Pointing theorem. What does pointing vector represents? 6M
- b Define the Following terms
- i) Uniform plane wave (ii) Skin depth (iii) Critical Angle (iv) Total Internal Reflection. 6M

OR

- 8 a Derive the Relation between \mathbf{E} and \mathbf{H} in free Space. 6M
- b Derive the Expression for Transmission Coefficient for the Horizontal Polarization with Oblique incidence. 6M

UNIT-V

- 9 a Define Transmission line and Explain the Primary Constants 6M
 b An air line has a Characteristic Impedance of 70Ω and phase Constant of 3 rad/m at 100 MHz . Calculate R, C, and L 6M
- OR**
- 10 a Derive the expression $Z_0 = \sqrt{Z_{OC} Z_{SC}}$ 6M
 b What is the Characteristic Impedance? Obtain the Relation between Characteristic Impedance and the Propagation Constant. 6M

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