Q.P. Code: 16EC409 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations December 2018

ELECTRO MAGNETIC THEORY AND TRANSMSSON LINES

(ECE)

Time: **3 hours** Max. Marks: **60**

(Answer all Five Units **5 X 12 =60** Marks)

UNIT-I

1 a. State the Coulomb's law in SI units and indicate the parameters used in the equations with the help of a diagram. 6M

b. Derive the expression for Electric field intensity ($\vec{E}$) at any point due to finite length charge with suitable sketches.
Planes x = 2 and y = -3 respectively, carry charges 10 nC/m^2 and 15 nC/m^2. If the line x = 0, z = 2 carries charge 10π nC/m, calculate E at (1, 1, -1) due to the three charge distributions. 6M

OR

2 a. Derive the Maxwell equations for electrostatic fields 7M

b. Apply the Gauss's law to find the electric field intensity due to a point charge Q located at origin. 5M

UNIT-II

3 Explain mutual inductance. Find the self-inductance of a coaxial cable of length d with radius of a, b for inner conductor and out conductor respectively. 12M

OR

4 a. State and explain the Biot-Savart's Law. 6M

b. Planes z=0 and z=4 carry current K=-10axA/m and K=10axA/m, respectively. Determine H at i) (1,1,1) ii) (0,-3,10) 6M

UNIT-III

5 a. Tabulate Maxwell's equations in both point form and integral form. 6M

b. Derive the boundary conditions for Dielectric-Dielectric boundary. 6M

OR

6 a. Derive the expression for displacement current density. 6M

b. In free space E= 20 cos(ωt-50x)a_y V/m.
Calculate a) J_d b) H c) ω 6M

UNIT-IV

7 a. What is Uniform Plane Wave Propagation? Explain in detail. 6M

b. Derive the solutions of the Uniform Plane Wave equation. 6M

OR

8 a. State and Prove the Pointing Theorem. 6M

b. A lossy Dielectric has an intrinsic impedance of 200 $\angle 30^0$ Ω at a particular radian frequency ω. If, at the frequency, the plane wave propagating through the dielectric has the magnetic field component H= 10 $e^{-\alpha x}$ cos (ω t-0.5x) ay A/m find E and α. 6M

UNIT-V

9	Derive the Expression For. a) Input Impedance b) Standing Wave Ratio.	12M
	OR	
10	A lossless Transmission line with Z0= 50 Ω is 30m long and operates at 2MHz. The line is terminated with a load ZL=60+j40 Ω, if u=0.6c, where c is Speed of light in a Vacuum, on the line, find the following using Smith Chart a) The Reflection Coefficient. b) The standing wave ratio. c) The input impedance.	12M

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