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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations October-2020

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(Electronics & 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 F that exists between two unlike Charges?	**6M**
	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 Power on Q1.	**6M**

OR

2	**a**	Derive the Continuity Equation and Relaxation time for Electrostatic Fields.	**6M**
	b	In a one-dimensional device, the Charge density is given by .If = 0 at x=0 and V=0 at x=a, find V and E .	**6M**

UNIT-II

3	**a**	Define and Derive Maxwell's Equations for Elctric and magnetic Fields.	**8M**
	b	Given Magnetic Vector potential wb/m, Calculate the total magnetic flux crossing the 5 m $2 \leq \leq \leq \rho \leq = \pi \phi$.	**4M**

OR

4	**a**	Define Magnetic Force. Explain about the Magnetic force on a one Current Element.	**7M**
	b	In a Conducting Medium, A/m , Find (i) j at (1,0,-3) (ii) The Current Passing through y=1, $1 \leq z \leq 1, 0 \leq x \leq 0$.	**5M**

UNIT-III

5	**a**	State and Explain the Faraday's laws in Electromagnetic induction.	**6M**
	b	Explain (i) Motional e.m.f (ii)Transformer e.m.f	**6M**

OR

6	**a**	Derive the Boundary Conditions for time varying Fields.	**5M**
	b	A Parallel-plate capacitor with plate area of 5cm2 and Plate separation of 3 mm has a voltage 50sin103 t V applied to its plates.Calculate the Displacement Current assuming $\varepsilon = 2\ \varepsilon_{o.}$	**7M**

UNIT-IV

7	**a**	State Poynting theorem. What does poynting vector represents?	**6M**
	b	Given a Uniform Plane wave in air as V/m. Find Hi , and if the wave encounters a perfectly conducting plate normal to the z-axis at z=0,find the reflected wave Er and Hr	**6M**

OR

8	**a**	Define the Following terms (i)Uniform plane wave (ii) Skin depth (iii)Critical Angle (iv)Total Internal Reflection.	**6M**
	b	Calculate the reflection coefficient for vertical polarization with oblique incident on perfect dielectric.	**6M**

UNIT-V

9	**a**	Obtain the input impedance of Transmission line of length l characterized by Z0 and	**6M**
	b	A telephone line has R=30 Ω /km, L=100 mH/km, G=0 and C=20 μF/km, At f=1 KHz obtain Z0, γ and Phase Velocity (u).	**6M**

OR

10	**a**	Derive the Expression $Z_O{}^2 = Z_{OC}\, Z_{SC}$.	**6M**
	b	A Certain transmission line operating at ω =106 rad/s has α =8 dB/m, =1 rad /m , and is 2m long. If the line is connected to the source of V,Zg=40 Ω And terminated by the load ,Determine the (i)Input impedance (ii)The sending-end Current (iii)The Current at the middle of the line.	**6M**

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