Q.P. Code: 20EC0415 **R20**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations March-2023

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	Define Electric Potential. Find the electric potential for a point charge is located at origin and Write Maxwell's second equation for electrostatic field.	CO2	L3	8M
	b	A point charge Q= 30 nC is located at the origin in Cartesian co-ordinates. Find the electric flux density D at (1,3,-4).	CO2	L2	4M
		OR			
2	a	Deduce the electric field Intensity due to Surface charge.	CO3	L4	6M
	b	Determine the Electric flux density at a point P due to infinite sheet of Charge using Gauss law.	CO2	L3	6M

UNIT-II

3	a	Explain Biot-Savart's Law.	CO1	L2	6M
	b	A Positive Y-axis (Semi Infinite Line with respect to the Origin) Carries a Filamentary Current of 2 A in the -ay Direction. Assume it is part of a large circuit. Find **H** at (i) A(2,3,0). (ii) B(3,12,-4).	CO2	L3	6M
		OR			
4		Explain any two applications of Ampere's Circuit law.	CO3	L2	12M

UNIT-III

5	a	In free space, **E**= 20 cos(ωt-50x)**ay** V/m. Calculate **Jd, H**.	CO4	L3	8M
	b	Why ampere's Law is In-consistent.	CO2	L4	4M
		OR			
6	a	Determine the Transformer EMF for the time varying fields.	CO4	L3	6M
	b	Explain the motional EMF and derive the expression for the maxwell equation.	CO4	L3	6M

UNIT-IV

7		Discuss about power and Poynting vector.	CO5	L2	12M
		OR			
8	a	Evaluate the wave equation in lossy dielectric medium for sinusoidal time variations.	CO5	L4	6M
	b	Derive the expression for intrinsic impendence and propagation constant in a good conductor.	CO5	L3	6M

UNIT-V

9		A 30 m long lossless transmission line with Z0 = 50Ω operating at 2 MHz is terminated with a load ZL = 60 + j 40Ω. If u = 0.6 C on the line, find the reflection coefficient, the standing wave ratio S and the input impedance. (i) without using smith chart (ii) Using smith chart	CO6	L3	12M
		OR			
10		Deduce the equation for voltage and current at any point in a transmission line.	CO6	L4	12M

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