O.P.Code: 20EC0415	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year I Semester Regular & Supplementary Examinations February-2024
ELECTROMAGNETIC THEORY AND TRANSMISSION LINES
(Electronics & Communications Engineering)

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

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

UNIT-I

1	a	Define Coulomb's law and derive the force F that exists between two unlike charges.	CO1	L1	6M
	b	Two-point charges, QA = +8 μC and QB = -5 μC, are separated by a distance r = 10 cm. What is the magnitude of the electric force between them?	CO2	L3	6M

OR

2	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	6M
	b	Determine the Relationship between E and V.	CO2	L3	6M

UNIT-II

3	a	Explain Ampere's Circuit Law	CO1	L2	6M
	b	Determine the Magnetic Field Density due to Infinite line Current by applying Ampere's Circuit law.	CO3	L3	6M

OR

4	a	Discuss about Magnetic Vector and Scalar Potentials	CO1	L2	6M
	b	List differential and integral form of Maxwell's equation for static EM filed.	CO2	L1	6M

UNIT-III

5	a	Determine the Expressions for inconsistency of Ampere's law.	CO3	L3	6M
	b	Why ampere's Law is In-consistent for timevarying fields.	CO2	L4	6M

OR

6	a	Prove that one of the Maxwell's equations is $\nabla \times H = J + Jd$	CO4	L5	6M
	b	An antenna radiates in free space and E= 80 cos(500t-8z)ax V/m. Calculate ω and β.	CO2	L3	6M

UNIT-IV

7	a	Derive the characteristics of plane wave in free space.	CO5	L3	6M
	b	Derive the expression for intrinsic impendence and propagation constant in a good conductor.	CO5	L3	6M

OR

8		Derive the expressions for reflection coefficient and transmission coefficient for reflection of plane wave at oblique in perpendicular polarization.	CO5	L3	12M

UNIT-V

9	a	Define Transmission line and Discuss about Transmission line Parameters	CO6	L2	6M
	b	With neat sketch explain about Primary and Secondary constants of transmission line.	CO6	L3	6M

OR

10		A lossless transmission line with Z0=50 Ω is 30m long and operates at 3MHz. The line is terminated with a load ZL= 70 +j50Ω, If u=0.6c on the line. Compute reflection coefficient, standing wave ratio and Input impedance, load impedance, (i) without using smith chart (ii) Using smith chart	CO6	L3	12M

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