O.P.Code: 20EE0204	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Regular & Supplementary Examinations December-2023

ELECTROMAGNETIC FIELDS

(Electrical and Electronics Engineering)

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

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

UNIT-I

1	a	Find the distance from A (r=4,θ=20° & ϕ=120°) B ((r=2,θ=80° & ϕ=30°)	CO1	L3	6M
	b	Transfer the cartesian Co-ordinates X=2, Y=1, Z=3 into spherical co-ordinates systems.	CO1	L3	6M

OR

2		Find the gradient of the following scalar fields: i) $V= e^{-z} \sin 2x \cosh y$, ii) $U= r^2 z \cos \phi$ and iii) $W= 10r \sin^2\theta \cos\phi$	CO1	L3	12M

UNIT-II

3	a	Find E at (0,0,2) m due to charged circular disc in x-y plane with ρ_S=20 n C/m^2 and radius 1m.	CO2	L3	6M
	b	A circular disc of 10 cm radius is charged uniformly with total charge of 100μc . Find E at a point 20cm on its axis.	CO2	L3	6M

OR

4		Find V at P (2,1,3) for the field of two coaxial conducting cones, with V=50 V at θ=30 and V=20 V at θ=50.	CO2	L3	12M

UNIT-III

5	a	Derive the expression for parallel plate capacitor and capacitance of a co-axial cable?	CO3	L3	6M
	b	A parallel plate capacitor has an area of 0.8 m^2 separation of 0.1 mm with a dielectric for which ε_r = 1000 and a field of 10^6 V/m. Calculate C and V	CO3	L3	6M

OR

6	a	Determine whether or not the following potential fields satisfy the Laplace's equation $V=x^2-y^2+z^2$&ii) $V= r\cos\phi + z$	CO3	L3	6M
	b	Derive Laplace's and Poisson's Equation.	CO3	L3	6M

UNIT-IV

7		Calculate the inductance of a 10 m length of coaxial cable filled with a material for which μ_r = 80 and radii inner and outer conductors are 1 mm and 4 mm respectively.	CO4	L3	12M

OR

8		In cylindrical co-ordinates A=50 r^2 a_z wb/m is a vector magnetic potential in a certain region of free space. Find H, B, J and using J find the total current I crossing the surface 0<r<1 , 0<ϕ<2π and Z=0.	CO4	L4	12M

UNIT-V

9		Write Maxwell's equation in good conductors for time varying fields and static fields both in differential and integral form.	CO5	L4	12M

OR

10		Explain faradays law of electromagnetic induction and derive the expression for induced EMF.	CO5	L4	12M

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