Q.P. Code: 18EE0203 **R18**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations December-2021

ELECTROMAGNETIC FIELDS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	a	Write the condition for Laplace equation.	L1	2M
	b	Define dipole moment.	L1	2M
	c	Define Dielectric Strength.	L1	2M
	d	What is the inductance of Solenoid.	L1	2M
	e	Write Maxwell equations in time varying fields.	L5	2M

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2		The vector from the origin to point A is given as (6,-2,-4), and the unit vector directed from the origin toward point B is (2, -2,1)/3. If points A and B are ten units apart, find the Coordinates of point B.	L1	10M

OR

3		Given point P(r=0.8, θ=30o, Φ=45o), and E= 1/r2(cosΦar+sinΦ/sinθaΦ); (i) Find E at P; (ii) Find at P; (iii) Find a unit vector in the direction of E at P. E	L1	10M

UNIT-II

4	a	State and explain Coulomb's law indicating clearly the units of quantities in the equation of force?	L5	5M
	b	State and prove Gauss's law and write limitations of Gauss's law.	L5	5M

OR

5	a	Derive Laplace and Poisson's equation.	L3	5M
	b	Find electric potential due to electric dipole.	L1	5M

UNIT-III

6	a	Derive the expression for capacitance of a co-axial cable.	L3	5M
	b	A parallel plate capacitor has a plate area of 1.5m2 and a plate separation of 5mm. Three are two dielectrics in between the plates. The first dielectric has a thickness of 3mm with a relative permittivity of 6 and the second has a thickness of 2mm with a relative permittivity of 4. Find the capacitor.	L1	5M

OR

7	a	Derive the continuity equation. What is its physical significance?	L3	6M
	b	Derive the point form of ohms law.	L3	4M

UNIT-IV

8	a	State and explain Biot-savart's law.	L5	6M
	b	Explain Maxwell's second equation.	L5	4M

OR

9	**a**	A coil of 1000 turns is wound on a Toroidal iron ring of mean radius 10cm and cross section of 3cm2. Find the self-inductance of the winding if the relative permeability of iron is 800.	**L1**	**5M**
	b	Explain scalar magnetic potential and its limitations.	**L5**	**5M**

UNIT-V

10	**a**	A copper wire carries current of 1A. Determine displacement current in the wire at 1 MHz for copper $\varepsilon=\varepsilon o$ and $\sigma=5.8x107$?	**L5**	**5M**
	b	Explain pointing vector and its significance.	**L5**	**5M**

OR

11		Explain faradays law of electromagnetic induction and derive the expression for induced e.m.f?	**L5**	**10M**

END