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

Question Paper Code: U3304

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Third Semester

Electrical and Electronics Engineering

21UEE304 - ELECTRO MAGNETIC FIELDS

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	State Gauss Divergence theorem	CO1-U
2.	What is the relation between vector potential and field strength	CO1-U
3.	Define Electric Field Intensity	CO1-U
4.	What is the difference between electric flux density and Current density	CO1-U
5.	Identify the energy storing element which stores the energy in magnetic field.	CO1-U
6	Identify the passive component which is used to store energy in magnetic field and write the formula for energy storage	CO2-App
7	For time varying field write the Maxwell equation which is derived from ampere circuital law	CO2-App
8	Define conduction current density	CO1-U
9	Write general wave equations in terms of Electric field	CO1-U
10	Write general wave equations in terms of Magnetic field	CO1-U

PART – B (5 x 16= 80 Marks)

11.	(a)	(i) State and prove stokes theorem with neat example. (ii) Given point P(-2,6,3) Express P in the Cartesian, cylindrical and spherical systems.	CO2-App	(16)

Or

	(b)	(i) State and prove Divergence theorem with neat example. (ii) Show that the vector H = (y2- z2+3yz-2x) a_x + (3xz+2xy) a_y + (3xy- 2xz+2z) $a_z$isboth irrotational and solenoidal.	CO2-App	(16)
12.	(a)	Two small identical conducting sphere have charges of 2nc and -1nc respectively. When they are separated by 4cm apart, find the magnitude of the force between them. If they are brought into contacts and then again separated by 4cm, find the force between them.	CO2-App	(16)
		Or		
	(b)	Apply Coulomb's law to determine the electric field intensity due to infinite line of uniform charged wire.	CO2-App	(16)
13.	(a)	At an interface separating two different magnetic materials show that the tangential component of magnetic field intensity is continuous across the boundary, whereas the normal component of magnetic field intensity is discontinuous at the boundary.	CO2-App	(16)
		Or		
	(b)	Derive the expressions for magnetic field intensity due to toroidal coil and circular coil	CO2-App	(16)
14.	(a)	State and explain Faraday's law of electromagnetic induction and derive the expressions for statically and dynamically induced emf.	CO1-U	(16)
		Or		
	(b)	Contrast electricity and magnetism by comparing their laws and parameters and constants	CO1-U	(16)
15.	(a)	Derive the electromagnetic wave equation and propagation constant and intrinsic impedance	CO2-App	(16)
		Or		
	(b)	Prove that the intrinsic impedance offered by free space is 120πΩ	CO2-App	(16)