

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech I Semester Supplementary Examinations, December – 2024

ELECTRO MAGNETIC FIELDS**(ELECTRICAL & ELECTRONICS ENGINEERING)****Time: 3 Hours****Max. Marks: 75**

Section – A (Short Answer type questions)		(25 Marks)		
Answer All Questions		Course Outcome	B.T Level	Marks
1.	State Gauss's law and give its expression.	CO1	L1	2M
2.	Define electric field intensity and electric potential and write the relationship between them.	CO1	L2	3M
3.	What is Capacitance? Give expression.	CO2	L1	2M
4.	What are dielectrics? What is the difference between dielectric and insulators?	CO2	L2	3M
5.	Define Self-inductance.	CO3	L1	2M
6.	What are the applications of Ampere's circuital law?	CO3	L2	3M
7.	What is displacement current?	CO4	L1	2M
8.	List the properties of vector magnetic potential.	CO4	L2	3M
9.	What are uniform plane waves?	CO5	L1	2M
10.	List Maxwell's equations for time varying fields.	CO5	L2	3M

Section B (Essay Questions)

Answer all questions, each question carries equal marks.		(5 X 10M = 50M)		
11. A)	i) Derive an expression for electric field intensity due to an electric dipole.	CO1	L3	5M
	ii) State and describe the coulombs law with units.			5M
OR				
B)	i) Find the electric field intensity due to infinite sheet of charge.	CO1	L2	5M
	ii) State and explain the Gauss's law and write its applications.			5M
12. A)	i) Briefly explain the behaviour of Conductors and Insulators in electric field.	CO2	L2	5M
	ii) State and explain continuity equation of current in integral form and point form.			5M
OR				
B)	i) Derive Laplace and Poisson equation.	CO2	L3	5M
	ii) State and prove the boundary conditions at the boundary between two dielectrics in electric fields.			5M
13. A)	Derive the expressions for magnetic field intensity and magnetic flux density due to circular coil.	CO3	L3	10M
OR				
B)	i) State Ampere's Law and explain how you find H using ampere's Law.	CO3	L2	5M
	ii) A current filament of 5A in the \underline{a}_y direction is parallel to the y-axis at $x = 2m, z = -2m$. Find H at the origin.		L3	5M

14. A) i) Explain how a differential current loop acts as magnetic dipole. CO4 L2 5M
 ii) Derive the expression for Force between two straight long and parallel current carrying conductors. 5M
- OR**
- B) i) Derive the expression for energy stored and density in a magnetic field. CO4 L3 5M
 ii) Define and explain Scalar Magnetic potential and its limitations. 5M
15. A) i) Write the Modified Maxwell's equations for time varying fields. CO5 L2 5M
 ii) Explain Faraday's laws of electromagnetic Induction. 5M
- OR**
- B) i) State and prove the Poynting theorem. L2 5M
 ii) A plane transverse electromagnetic wave has a power density of 1.2 W/m^2 in a medium with $\epsilon_r = 3$ and $\mu_r = 1$. Find the amplitudes of electric and magnetic field intensities. CO5 L3 5M