R22 Regulation *Subject code:* **4E3BE**

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Regular Examinations, February 2024

ELECTRO MAGNETIC FIELDS

(EEE)

Maximum Marks: 60 Date: 26.02.2024 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

	Part-A	CO	Bloom Tx
All the following questions carry equal marks (10x1M=10 Marks)			
1.a)	State Coulomb's law.	1	1
b)	Determine the force between two charges $3*10^{-4}$C at P (1, 2, 3) and 10^{-4}C at Q (2, 0, 5) in vacuum.	1	2
c)	What is Capacitance? Give expression.	2	1
d)	List out the basic properties of good conductor?	2	1
e)	Define magneto static field	3	1
f)	Define Self-inductance.	3	1
g)	Define time varying fields?	4	1
h)	What is displacement current?	4	1
i)	Explain Wave propagation in conducting medium	5	2
j)	What are uniform plane waves?	5	1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			Bloom Tx level
2	a) Explain about components of vectors and scalars with examples [5m] b) How to transform the vectors from one coordinator system to another. [5m]	1	3 3
	OR		
3	Describe different types of coordinate systems with neat sketches. [10M]	2	4
4	a) Derive the expressions for electrostatic energy and energy density. [5m] b) Explain about the coulomb's law. [5m]	2	4 2
	OR		
5	a) Explain about the gauss law and its applications. [5m] b) State and prove the boundary conditions at the boundary between two dielectrics in electric fields. [5m]	3	4 4
6	a) State and derive the Ohm's law in point form.[5m] b) Explain about current density and derive its equation. [5m]	3	4 2
	OR		
7	a) Derive the expression for the capacitance of two- wire line. [5m] b) Explain in detail about Biot-Savart's law. [5m]	3	4 2
8	a) Derive the expression for the force between two finite current carrying	4	4

	loops? [5m] b) Evaluate H everywhere for an infinitely long coaxial transmission line of radius 'a' placed along z-axis which carries current along az. Sketch magnitude of H as a function of current. [5m]		4
	OR		
9	a) Explain the faraday's laws of electromagnetic induction. [5m] b) Write a note on Motional Electromotive forces. [5m]	4 5	4 1
10	a) Derive electromagnetic Wave Equation. [5m] b) State and explain Poynting Theorem. [5m]	5 5	4 2
	OR		
11	Write short notes on a) Skin Effect [5m] b) Uniform plain waves. [5m]	5	3