R20 Regulation *Subject code: 3P3BE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, December 2025

ELECTROMAGNETIC FIELDS
(EEE)

Maximum Marks: 70 Date: 24.12.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 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

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Define Gauss law.	2M	1	L1
2	What is physical significance of divergence of D?	2M	1	L1
3	Define potential.	2M	2	L1
4	State point form of ohms law.	2M	2	L1
5	Derive Maxwell's third equation.	2M	3	L1
6	State Biot-Savart's law.	2M	3	L1
7	Define Self inductance.	2M	4	L1
8	What is meant by mutual inductance?	2M	4	L1
9	How Maxwell's equations are modified for time varying electric?	2M	5	L1
10	What is meant by the term displacement current?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Derive the expression for electric field intensity due to line charge, surface charge, volume charge.	10M	1	L2
	OR			
12	Find the force between two straight long and parallel current carrying conductors in the same and opposite directions.	10M	1	L2
13	Explain statically and dynamically induced e.m.fs	10M	2	L2
	OR			
14	State and prove the conditions on the tangential and normal components of electric flux density and electric field intensity, at the boundary between the dielectrics.	10M	2	L2
15	Derive the expression for amperes circuital law and application of co axial length of the conductor.	10M	3	L2
	OR			
16	a) Explain the concept of scalar and vector magnetic potentials. b) Find the inductance of toroid.	5M 5M	3	L2

17	Explain the Biot-Savart's law for magnetic field B due to a steady line current in free space.	10M	4	L2
	OR			
18	Find the force between two straight long and parallel current carrying conductors in the same and opposite directions.	10M	4	L2
19	Write Maxwell's equations in point form and explain physical significance of the equations.	10M	5	L2
	OR			
20	a) State and explain the Faraday's laws in electromagnetic induction. b) Explain statically and dynamically induced e.m.fs.	5M 5M	5	L2