R20 Regulation *Subject code: 3P4DE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, June 2026

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES (ECE)

Maximum Marks: 70 Date: 17.06.2026 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	What is the energy stored by the parallel plate capacitor?	2M	1	L1
2	Write the Maxwell's two equations for electrostatic fields.	2M	1	L1
3	State Biot - Savart's law.	2M	2	L1
4	Define magnetic flux density.	2M	2	L1
5	Define the term "Uniform plane waves."	2M	3	L1
6	Define skin depth.	2M	3	L1
7	List the different types of transmission lines?	2M	4	L1
8	How does group velocity vary when compared to phase velocity?	2M	4	L1
9	Define reflection coefficient?	2M	5	L1
10	Write the advantages of stub matching.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) State and explain the coulomb law. b) Two Point charges 1 mC and - 2 mC are located at (3, 2, -1) and (1, 1, 4), respectively. Calculate the electric force on a 10nC charge located at (0, 3, and 1) and the electric field intensity at that point.	5M 5M	1	L2
	OR			
12	a) Derive the continuity equation. b) Derive the expression for relaxation time.	5M 5M	1	L2
13	Explain about magnetic scalar and vector potentials.	10M	2	L2
	OR			
14	Write Maxwell's equations for time varying fields in word statements and point form.	10M	2	L2
15	State and prove Poynting theorem.	10M	3	L2
	OR			
16	Derive an expression for reflection and transmission coefficient for a uniform plane wave incident normally between two dielectric media.	10M	3	L2
17	Derive an expression of V and I for Transmission line.	10M	4	L2

	OR			
18	Derive and explain the condition for minimum attenuation.	10M	4	L2
19	Determine the input impedance for $\lambda/2$, $\lambda/4$ and $\lambda/8$ lines impedance transformations.	10M	5	L2
	OR			
20	What is single stub matching? Find the length and location of the single stub to avoid the reflections from the load end.	10M	5	L2