R22 Regulation *Subject code:4E4DE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Regular/Supplementary Examinations, June 2026

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

(ECE)

Maximum Marks: 60 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 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

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Write the relation between electric field intensity and electric potential.	1M	1	2
b)	Define different charge distributions	1M	1	1
c)	Define magnetic flux and flux density.	1M	2	1
d)	State Faraday's law?	1M	2	1
e)	What is uniform plane wave?	1M	3	1
f)	What is the difference between normal incidence and oblique incidence?	1M	3	2
g)	Draw the equivalent circuit of the transmission line?	1M	4	3
h)	What is loading of transmission lines?	1M	4	2
i)	A loss less line of 300Ω characteristic impedance is terminated in a pure resistance of 200Ω. Find the value of standing wave ratio.	1M	5	3
j)	What is meant by stub matching?	1M	5	2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Explain Electric field intensity. b) Evaluate the electric field intensity at a point P (-5, 7,-4) in free space due to a charge of 0.2 milli coulombs placed at point R (2,-1,-2).	3M 7M	1	3
	OR			
3	Point charges Q_1 and Q_2 are respectively located at **(4, 0,-3)** and **(2, 0, 1).if Q_2=4nC** find another point charge when i) Electric field intensity on a charge at a point **(5, 0, 6)** has no **z**-component. ii) Force on a charge at a point **(5,0,6)** has no **x**-component.	10M	1	4
4	State Biot-savart's law and derive an expression for H of infinitely long straight conductor with line current placed along z-axis?	10M	2	3
	OR			
5	Derive the expression for the force between two finite current carrying	10M	2	4

	loops.			
6	Illustrate the reflection by a perfect conductor at oblique incidence. Formulate the expressions for electric field for Perpendicular polarization.	10M	3	4
	OR			
7	a) Describe the wave propagation in perfect dielectric Medium. b) Describe Brewster angle.	5M 5M	3	2
8	a) Derive the condition for distortion less transmission line. b) What is matched transmission line? Why is matching of load impedance is needed.	5M 5M	4 4	4 2
	OR			
9	Derive the transmission line equations for V and I, in terms of the source parameters?	10M	4	4
10	Explain the significance and design of single stub impedance matching. Discuss the factors on which length depends?	10M	5	4
	OR			
11	a) Determine the input impedance for $\lambda/2$, $\lambda/4$ and $\lambda/8$ lines impedance transformations. b) A low loss transmission line of 100 ohms characteristic impedance is connected to a load of 400 ohms. Calculate reflection coefficient and voltage standing wave ratio.	5M 5M	5	3