



**R20 Regulation** **Subject code:3P4DE**  
**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**  
 (Autonomous, Accredited by NAAC with 'A+' Grade)

**B.Tech IV Semester Supplementary Examinations, December 2024**

**ELECTROMAGNETIC THEORY AND TRANSMISSION LINES**  
**(ECE)**

**Maximum Marks: 70**

Date:12.12.2024

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 which carries 10M.
  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)	CO	Bloom Tx
1	What are the different types of charges?		1	L1
2	Write the Maxwell's two equations for electrostatic fields?		1	L1
3	State Bio-savart's law?		2	L1
4	List the boundary conditions for dielectric conductor interfaces.		2	L1
5	What are good conductors and good dielectrics?		3	L1
6	Define reflection coefficient and transmission coefficient.		3	L1
7	List the types of transmission lines.		4	L1
8	Define reflection coefficient and VSWR.		4	L1
9	What are the advantages of a Single Stub?		5	L1
10	List the applications of smith chart.		5	L1

**Part-B**

Answer All the following questions.		(5X10M=50Marks)	CO	Bloom Tx
11	A. State and explain the coulomb law? B. Point charges 1 mC and - 2 mC are located at (3, 2, -1) and (1, 1, 4), respectively. Calculate the electric force on a 10-nC charge located at (0, 3, and 1) and the electric field intensity at that point. [10M]		1	L2
OR				
12	Using Gauss's law derive expressions for electric field intensity and electric flux density due to an infinite line of conductor of charge density $\rho C/m^2$ . [10M]		1	L2
13	Explain Biot-Savart's law and find the magnetic field intensity due to a straight wire carrying constant current I. [10M]		2	L2
OR				
14	A. Explain the transformer and motional EMFs? [5M] B. Determine the general solution for uniform plane wave equation? [5M]		2	L2
15	Derive the wave equations for conducting medium, perfect dielectric medium and free space. [10M]		3	L2

16	Derive the relationship between E and H in a uniform plane wave. Find the value of intrinsic impedance of free space. [10M]	3	L2
17	Derive the expression for voltage and current at any point on the transmission line in terms of characteristic impedance. [10M]	4	L2
OR			
18	A. Derive and explain the condition for minimum attenuation. [5M] B. Write about group velocity and phase velocity? [5M]	4	L2
19	A. Explain the principle of single stub matching. [5M] B. Write Short notes on Smith Chart? [5M]	5	L2
OR			
20	Derive the relation between reflection coefficient and characteristic impedance. [10M]	5	L2