Regulation R18 *Subject code: 2P5DA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech V Semester Supplementary Examinations, June/July 2023
ELECTROMAGNETIC THEORY AND TRANSMISSION LINES
(ECE)

Maximum Marks: 70 Date:23.06.2023 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)**

1 State Gauss's law.
2 Write the capacitance of a spherical capacitor?
3 State Maxwell's equations for a lossless or non-conducting medium.
4 State the Ampere's Force Law.
5 Give an expression for intrinsic impedance in phasor form. What are and phase components?
6 Define the loss tangent.
7 List any four types of transmission lines.
8 How does group velocity vary when compared to phase velocity?
9 Define Smith Chart.
10 What are the advantages and disadvantages of a Single Stub?

Part-B

Answer All the following questions. **(10M X 5=50Marks)**

11 State Coulomb's Law. Find the force on charge Q_1, 30 μC due to a change Q_2,-200 μC, where Q_1 is at (0,0,2) m and Q_2 is at (2,1,0) m. [10]

OR

12 Discuss the Maxwell's equations for electrostatic fields. [10]

13 Derive the expressions for the different types of magnetic lines of forces. [10]

OR

14 What are boundary conditions? State the boundary conditions at the interface of dielectric and perfect conductor. [10]

15 What are the wave equations for a lossless medium and a conducting medium for sinusoidal variations? [10]

OR

16 Write short notes on normal incidence of a plane wave on a perfect dielectric. [10]

17 Derive the expression for voltage and current at any point on the transmission line in terms of characteristics impedance. [10]

OR

18 a) What is distortion? State the conditions that characterize a distortion less line. [5]
b) The propagation constant of a lossy transmission line is $(1+j2)m^{-1}$ and its characteristic impedance is 20 Ω at w = 1M rad/s. Find L,C, R and G for the line. [5]

19 a) What are the applications of transmission lines? [5]
b) How can ultra-high frequency transmission lines be used as circuit Elements? [5]

OR

20 a) What are the applications of SmithChart? [5]
b)Discuss about single stub matching. [5]