



R18 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

Subject code: 2P5DA

B.Tech V Semester Regular Examinations, February 2021

Electromagnetic Theory and Transmission Lines (Electronics and Communication Engineering)

Maximum Marks: 70

Date: 17.02.2021 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 Define Stokes theorem.
- 2 Give the relationship between the E and V.
- 3 State Ampere's circuital law and list any two applications.
- 4 Write Maxwell's equation on Differential form and word form.
- 5 Define the term "Uniform plane waves."
- 6 Define electromagnetic waves (or) EM waves?
- 7 List the different types of transmission lines?
- 8 When does a transmission line acts as an infinite line?
- 9 It is required to match a 200 ohms load to a 300 ohms transmission line to reduce the SWR along the line to 1. What must be the characteristic impedance of the quarter wave transformer used for this purpose if it is directly connected to the load?
- 10 What are the uses of smith chart?

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 A.State and explain the coulomb law? (5M)
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. (5M)

OR

- 12 a) Derive Coulomb's law from Gauss law.(5M)
b) Explain the concept of electric field intensity.(5M)
- 13 Estimate the magnetic field intensity due to circular conductor using Biot-Savart's law.(10M)

OR

- 14 Derive the boundary conditions
a) Dielectric-Dielectric interface (5M)
b) Dielectric-Conductor interface (5M)

- 15 Derive the relation between E and H in free space.(10M)
OR
- 16 For a given uniform plane wave in air as $E = 40 \cos(\omega t - \beta z)a_x + 60 \sin(\omega t - \beta z)a_y$ V/m. Find H_i and if the wave encounters a perfectly conducting plate normal to the z- axis at $z=0$, find the reflected wave E_r and H_r .(10M)
- 17 A generator of 1 volt operating at a frequency of 1KHz , supplies power to a 100 km open-wire line terminated in Z_0 and having the following parameters: Series resistance $R=10 \Omega/\text{km}$, series inductance $L=0.004 \text{ H/km}$, Shunt conductance $G=0.4 \times 10^{-6} \text{ mho/km}$ and capacitance between conductors $C=0.008 \times 10^{-6} \text{ F/km}$. Find the characteristic impedance, propagation constant, attenuation constant, phase shift constant , velocity of propagation and wavelength.(10M)
OR
- 18 Derive the Transmission line equation for Voltage and Current? (10M)
- 19 State and prove the Poynting theorem.(10M)
OR
- 20 Illustrate the transmission of TM waves between two parallel perfectly conducting planes with necessary equations and diagram. (10M)