Code No: R1922043 **R19** SET - 1

**II B. Tech II Semester Regular Examinations, August/September - 2021**
**ELECTROMAGNETIC WAVES AND TRANSMISSION LINES**
(Electronics Communication Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks

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**UNIT - I**

1 a) What are the major losses that occur in transmission lines? How a lossless line Characterized? [8M]

b) Show that a transmission line will be distortion free if CR= LG. [7M]

OR

2 a) Define and explain both lossless and distortion less transmission lines in terms of transmission line parameters. [8M]

b) Derive the transmission line equation. [7M]

**UNIT - II**

3 a) Find the input impedance of a 75Ω lossless transmission line of length (0.1λ) If it is terminated in open circuit(using smith chart) [8M]

b) Write short notes on different lengths of Transmission lines with open end load? [7M]

OR

4 a) Explain the principle of impedance matching with quarter wave transmission line [8M]

b) A 50 Ω coaxial cable feeds a 75 + j20 Ω dipole antenna. Find reflection coefficient and standing wave ratio. [7M]

**UNIT - III**

5 a) Derive Poisons and Laplace equations from fundamentals. [8M]

b) Three parallel line charges 5nC/m, 4 nC/m and -6 nC/m respectively are located at (0,0), (3,0) and (0,4)m respectively. Find electric flux density (D) and electric filed intensity (E) at (3,4). [7M]

OR

6 a) Derive an expression for the electric field intensity due to a finite length line charge along the Z- axis at an arbitrary point Q( x,y,z). [8M]

b) A line charge ρ= 200pC/m lies along the X- axis. The surface of zero potential passes through the point P(0,5,4). Find the potential at point (1,3,-2). [7M]

**UNIT - IV**

7 a) Explain Biot-savart law with necessary mathematical expressions. [8M]

b) Derive Maxwell's equations in Integral and Differential forms for time varying fields. [7M]

OR

8 a) A thin ring of radius 5 cm is placed on plane Z=1cm, so that its center is at (0,0,1) cm. If the ring carries 50mA along $\mathbf{a_\Phi}$. Find **H** at (i) (0,0,-1)cm (ii) (0,0,10) cm. [8M]

b) State Maxwell's equations for magneto static fields. [7M]
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**UNIT - V**

9 a) For good dielectrics derive the expressions for α, ß, ν and η. [8M]

b) Find α, ß, ν and η. for Ferrite at 10GHz $\epsilon_r = 9$, $\mu_r = 4$, s = 10ms/m. [7M]

OR

10 a) Derive the expression for attenuation and phase constants of uniform plane wave. [8M]

b) Define Uniform plane wave. Prove that Uniform plane wave does not have field components in the direction of propagation. [7M]