

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)**

III B.Tech I Semester Supplementary Examinations, May - 2024

ELECTROMAGNETIC WAVES AND TRANSMISSION LINES

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70 M

**Answer ONE Question from each Unit
All Questions Carry Equal Marks**

Q. No.	Questions	BTL	CO	Marks
UNIT – I				
1.	a) What are the different types of transmission lines? Derive the transmission line equations.	K3	CO1	7 M
	b) What is a distortion less transmission line? Obtain the condition for it and give the expressions for characteristic impedance and phase velocity of it.	K3	CO1	7 M
OR				
2.	a) What is characteristic impedance of a transmission line? Find the input impedance of a transmission line terminated with characteristic impedance.	K3	CO1	7 M
	b) Find the characteristic impedance, propagation constant and velocity of propagation at $f=100\text{KHz}$ for a lossless transmission line having $L=33\mu\text{H/m}$ and $C=10\text{nF/m}$.	K3	CO1	7 M
UNIT – II				
3.	a) Derive the expression for input impedance of transmission line in terms of characteristic impedance.	K3	CO2	7 M
	b) What is reflection coefficient? Discuss it under different load conditions like $Z_L=0$, Z_0 and ∞ values.	K3	CO2	7 M
OR				
4.	a) Explain the importance of smith chart and its applications.	K2	CO2	7 M
	b) Explain the utility of $\lambda/8$, $\lambda/4$ and $\lambda/2$ transmission lines.	K2	CO2	7 M
UNIT – III				
5.	a) State and prove Gauss law in electrostatics. What is its importance?	K2	CO3	7 M
	b) Explain the terms electric field intensity, electric flux density, electric potential. What is the relation between E and D.	K1	CO3	7 M
OR				
6.	a) Derive the expression for energy density in electrostatic field.	K2	CO3	7 M
	b) Explain the terms convection and conduction currents. Derive poisson's equation in electrostatics.	K2	CO3	7 M

UNIT – IV					
7.	a)	Explain Biot-savarts law. Calculate the magnetic field intensity due to current carrying infinitely long conductor.	K3	CO4	7 M
	b)	State Amperes Force Law and calculate the force between two straight, infinitely long parallel current carrying conductors.	K3	CO4	7 M
OR					
8.	a)	Derive the expression for inductance of a solenoid and also give the expression for magnetic energy.	K3	CO4	7 M
	b)	Define displacement current density. State the inconsistency in Ampere's law and how it is modified.	K2	CO4	7 M
UNIT – V					
9.	a)	Derive the wave equations for a perfect dielectric medium.	K3	CO5	7 M
	b)	Derive the expression for intrinsic impedance of a lossless medium.	K3	CO5	7 M
OR					
10.	a)	State and derive Poynting theorem in electro magnetic field.	K3	CO5	7 M
	b)	Explain the concepts of depth of penetration, critical angle and surface impedance.	K1	CO5	7 M