



End Semester Examination – Nov/Dec – 2016

Code : **14EC2007**
Sub. Name : **Transmission Lines and Waveguides**

Semester : **2016-17 ODD**
Duration : **3hrs**
Max. marks : **100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	Discuss about different types of transmission lines.	CO1	8
	b.	A 300 m long line has the following primary constants: $R = 4.5 \text{ K}\Omega$, $L = 0.5 \text{ mH}$, $G = 60 \text{ mmho}$ and $C = 12 \text{ nF}$, operated at 6MHz frequency. Find the secondary constants and velocity of propagation.	CO1	12
(OR)				
2.	a.	Define waveform distortion and explain about its types. Also derive the condition for a distortionless transmission line.	CO1	10
	b.	Mathematically, observe frequency and delay distortion in an ordinary telephone cable. How could it be overcome?	CO1	10
3.	a.	Discuss the voltages and currents on a dissipation less transmission line and sketch the phasors for the following resistive loads: (a) Short Circuited Load (b) Open Circuited Load (c) Matched Load	CO1	14
	b.	A certain transmission line, operating at radio frequency has following constants $L = 10 \mu\text{H/m}$, $C = 16 \text{ pF/m}$. The line is terminated in a resistive load of 1000Ω . Find the reflection co-efficient and Standing wave ratio.	CO1	6
(OR)				
4.	a.	A lossless transmission line with characteristic impedance $Z_0 = 50 \Omega$ is terminated in a load of $Z_R = (50 + j50) \Omega$. Using Smith chart, find the following: i) VSWR ii) Magnitude and angle of reflection coefficient at the load iii) load admittance iv) Source impedance at a distance of $\lambda/4$ from the load v) Position of first voltage minimum from the load.	CO2	20
5.	a.	From the general expressions of Transverse Electric waves (TE), sketch the field distribution of the dominant mode in a parallel plate waveguide.	CO2	10
	b.	Derive the attenuation factor of a TEM mode in a parallel plate waveguide, whose field components are: $H_y = C e^{-j\beta z}$ $E_x = \beta C / \omega \epsilon [e^{-j\beta z}]$	CO2	10
(OR)				
6.	a.	The separation between the parallel plates of a waveguide is 3 cm. It is filled with a dielectric with relative permittivity of 4. The signal frequency is 6GHz. Find all propagating modes. For each of the propagating modes calculate the following: a) Cut off frequency b) Cut off wavelength c) Guide wavelength	CO2	20
7.	a.	Discuss about rectangular wave guide and derive its general field equations.	CO2	20
(OR)				
8.	a.	Derive the characteristics of TE and TM waves in a rectangular waveguide.	CO2	15

	b.	Discuss about excitation of modes in a rectangular waveguide.	CO2	5
		<u>Compulsory:</u>		
9.	a.	Write short notes on: [i] Microstrip Lines [ii] Slot Lines [iii] Circular waveguides [iv] Fin Lines	CO2	20

ALL THE BEST