KUMARAGURU
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B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U18ECT4104: Transmission Lines and Waveguides

COURSE OUTCOMES

CO1: Discuss the fundamental concepts of wave propagation in Transmission Lines and Wave Guides.
CO2: Analyze the line parameters and various losses in transmission lines.
CO3: Apply smith chart for line parameter and impedance calculations.
CO4: Evaluate the characteristics of Parallel plane and Rectangular wave guides.
CO5: Evaluate the characteristics of Circular wave guides and Rectangular cavity resonators.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Outline the Equivalent Circuit of a Transmission Line.	CO1	[K_1]
2.	What is meant by loading of transmission line?	CO1	[K_1]
3.	An ideal lossless quarter wave line of characteristic impedance 75 Ω is terminated in a load impedance of 100 Ω. Find the value of input impedance of the line.	CO2	[K_2]
4.	List the applications of smith chart.	CO2	[K_1]
5.	Compare TE and TM mode.	CO3	[K_2]
6.	For a frequency of 6 GHz and plane separation of 7 cm, with air dielectric between the planes, find the phase velocity of TE_1 mode.	CO3	[K_3]
7.	What is degenerate mode in rectangular waveguide?	CO4	[K_1]
8.	A rectangular waveguide of cross section 5 cm x 2 cm is used to propagate TM_{11} mode at 10 GHz. Calculate the cut off wavelength.	CO4	[K_2]
9.	Recall the Bessel's function of first kind of order zero.	CO5	[K_1]
10.	Define Quality Factor.	CO5	[K_1]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	Develop the general solution of a transmission line.	16	CO1	[K4]
12.	Formulate Campbell's Equation.	16	CO1	[K4]
13.	Determine the input impedance, VSWR, maximum and minimum line impedance, reflection coefficient of the transmission line of electrical length 28° with terminated load impedance of $Z_R/R_0 = 2.6+j1$. Use smith Chart.	16	CO2	[K4]
14.	Develop the expression for field components of an electromagnetic wave propagating between a pair of perfectly conducting planes.	16	CO3	[K4]
15.	Deduce the expression for the field components of TM waves guided along a rectangular waveguide.	16	CO4	[K4]
16.	Analyze the expression for field components of transverse electric wave in circular waveguide.	16	CO5	[K4]

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