Register No: _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025

Fifth Semester

Electronics and Communication Engineering

EC3551 – Transmission Lines and RF Systems

Smith Chart Can be Permitted

Regulations - 2021

Duration : 3 Hrs ***Maximum : 100 Marks***

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	List the conditions for distortion less line.	L1	1	2
2.	The open circuit and short circuit impedance of a transmission line at 1500 Hz are 800 ∠-30 Ω and 400 ∠-10 Ω respectively, Examine its propagation constant.	L4	1	2
3.	Illustrate the minimum values and maximum values of SWR and reflection coefficient.	L2	2	2
4.	List the function of nodes and anti nodes in a transmission line.	L4	2	2
5.	Analyze why Quarter wave line is called as copper insulator.	L4	3	2
6.	Identify the procedure to find the impedance from the given admittance using smith chart.	L3	3	2
7.	Justify, why TM_{01} and TM_{10} modes in a rectangular waveguide do not exists.	L5	4	2
8.	List Bessel's functions of first kind of order zero.	L2	4	2
9.	Analyze the techniques of efficiency boosting in RF power amplifier	L4	5	2
10.	Distinguish typical output stability circle and input stability circle	L3	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a	Interpret the general transmission line equation for the voltage and current at any point on a transmission line.	L2	1	16
		Or			
	b i	Explain in detail about the waveform distortion and also derive the condition for distortion less line.	L2	1	8
	ii	Explain in detail about open and short circuited lines.	L2	1	8
12.	a i	Explain the condition for the open wire line at high frequencies and derive the parameters.	L2	2	8

		ii	Explain the expressions for the input impedance of the dissipation less line. Deduce the input impedance of open and short-circuited dissipation less line.	L2	2	8
			Or			
	b	i	Summarize the relation between standing wave ratio (SWR) and magnitude of relation coefficient.	L2	2	8
		ii	Explain how the VSWR and wavelength of the line measured in detail.	L2	2	8
13.	a	i	Design a Quarter wave transformer to match a load of 200Ω to a source resistance of 500Ω which operates at the frequency of 200 MHz.	L4	3	8
		ii	Discuss the impedance matching technique using single stub and construct the expression for the stub location and stub length.	L3	3	8
			Or			
	b		A lossless line with Z_0 =70Ω is terminated with Z_R =115-j80Ω. Wavelength of transmission is 2.5 λ. Using smith chart evaluate the VSWR, reflection coefficient, input impedance and input admittance.	L5	3	16
14.	a		Explain the characteristics of TM and TE waves in case of circular wave guides.	L3	4	16
			Or			
	b		Interpret the propagation of TE waves in a rectangular waveguide with necessary expressions for the field components.	L2	4	16
15.	a	i	Compare the field effect transistor with the bipolar junction transistor.	L4	5	8
		ii	List and explain the distinct features of high electron mobility transistors.	L4	5	8
			Or			
	b	i	Compare and contrast the homodyne and heterodyne architecture of RF system.	L4	5	8
		ii	Analyze the various stabilization methods for a RF amplifier circuit.	L4	5	8