U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January 2024 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**
Course Code: 19EC7PCRFM **Max Marks: 100**
Course: RF and Microwave Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)		For the Low RF design consideration, write the steps involved by listing the facts why these waves are having negligible effect on circuit operation.	CO1	--	10
	b)		Discuss the effects of RF/microwaves signals which is not present at DC or low frequency signals in a circuit.	CO1	PO1	10
			OR			
2	a)		With necessary circuit diagrams bring out the general governing equations for voltage and current by modelling a transmission line for high frequencies.	CO1	--	10
	b)		A lossless transmission line with a characteristic impedance of 300Ω is fed by a generator of voltage$\angle 0^0$ and impedance of 100 Ω The line is 100m long and terminated by resistive load of 200Ω.Calculate reflection loss, transmission loss and the return loss.	CO2	PO1	06
	c)		Write the procedure for finding input impedance given the load impedance using smith chart.	CO1	--	04
			UNIT - II			
3	a)		Derive the properties of [S] matrix for passive microwave networks.	CO2	PO1	10
	b)		Derive the S-Matrix representation of a multiport network	CO2	PO1	10
			UNIT - III			
4	a)		Briefly describe construction, working and applications of following wave guide discontinuities with neat diagrams. (i) Bends (ii) Corners (iii) Twists	CO1	PO1	10

		b)	A magic-T is terminated at collinear points 1 and 2 and difference port 4 by impedances of reflection coefficients Γ_1 =0.5, Γ_2= 0.6 and Γ_4=0.8 respectively. If 1 watt is fed at sum port 3 calculate the power reflected at port3 and power transmitted to other ports.	***CO2***	***PO1***	**10**
			OR			
	5	a)	What are waveguide Tees? Derive the S-Matrix for H-Plane Tee.	***CO2***	***PO1***	**10**
		b)	With suitable diagrams and equations explain Faraday rotation isolator.	***CO1***	***PO1***	**10**
			UNIT -IV			
	6	a)	What are the necessary criteria for exhibiting Gunn effect and explain different modes of operations of Gun diode.	***CO1***	**-**	**10**
		b)	Bring out the comparison between IMPATT, TRAPATT BARITT diodes for the parameters (i) Operating frequency, (ii)Bandwidth ,(iii)Power output, (iv)Efficiency, (v)Noise figure, (vi)Harmonics	***CO3***	***PO2***	**10**
			UNIT -V			
	7	a)	List the hazards of microwaves on human body and explain any one medical application of microwave in detail.	***CO1***	***PO6, 7***	**10**
		b)	Discuss the material selection process for fabricating Monolithic Microwave Integrated Circuits.	***CO1***	**--**	**10**

****