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BEC701

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2026
Microwave Engineering and Antenna Theory

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the typical microwave system with a neat block diagram.	4	L2	CO1,2
	b.	With the help of a functional block diagram, explain the construction and mode of working of a GUNN diode.	6	L2	CO1,2
	c.	Derive Transmission line equations in Voltages and current forms.	10	L3	CO1,2
		OR			
Q.2	a.	Discuss the salient features of Transferred Electron Devices.	4	L2	CO1,2
	b.	A transmission line has the following parameter : R = 2Ω/m, G = 0.5 m mho/m f = 1 GHz, L = 8nH/m, C = 0.23pF Calculate : i) Characteristics impedance ii) Propagation constant.	10	L3	CO1,2
	c.	Explain the standing waves with neat wave forms.	6	L2	CO1,2
		Module – 2			
Q.3	a.	State and explain the properties of S-matrix representation of multiport networks.	4	L2	CO2,3
	b.	Derive the S-matrix for E-plane Tee and magic Tee.	10	L3	CO2,3
	c.	What are Attenuators? Explain the principle and working of precision type variable attenuator.	6	L2	CO2,3

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		OR			
Q.4	**a.**	Explain Circulator and Isolators in Microwave Devices.	**4**	**L2**	**CO2,3**
	b.	What are the characteristics of Magic Tee? And explain any 2 applications of magic tee.	**6**	**L3**	**CO2,3**
	c.	A 20 mW signal is fed into one of the collinear (port -1) of lossless H-plane T junction. Calculate the power delivered through each port when other ports are terminated in matched load.	**10**	**L3**	**CO2,3**
		Module – 3			
Q.5	**a.**	Discuss the Microstrip operation along with a neat schematic and its characteristics impedance expression.	**10**	**L2**	**CO4**
	b.	Explain the operation of parallel strip line along with a neat diagram. Write down the expression for characteristics imp.	**10**	**L2**	**CO4**
		OR			
Q.6	**a.**	State and prove Friss transmission equation.	**10**	**L2**	**CO4**
	b.	Discuss and Interpret on Antenna field zones.	**10**	**L2**	**CO4**
		Module – 4			
Q.7	**a.**	State and explain the power theorem and its application to an isotropic source.	**4**	**L2**	**CO5**
	b.	Derive field expression of two isotropic point sources of same amplitude and phase.	**8**	**L3**	**CO5**
	c.	Derive an expression for radiation resistance of short electric Dipole.	**8**	**L3**	**CO5**
		OR			
Q.8	**a.**	Distinguish between End fire array and Broad side array.	**4**	**L2**	**CO5**
	b.	Derive an array factor expression in case of linear array of 'n' isotropic point source of equal amplitude and spacing.	**8**	**L3**	**CO5**
	c.	Starting form electric and magnetic field potential, obtain the far-field component for a short dipole.	**8**	**L3**	**CO5**
		Module – 5			
Q.9	**a.**	Derive an expression for radiation resistance of a small loop antenna.	**12**	**L3**	**CO5**
	b.	Explain different types of horn antennas with diagrams.	**8**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the constructional details for following antennas : i) Horn antenna ii) Parabolic reflector.	**8**	**L2**	**CO5**
	b.	Derive the far field expression for small loop antenna.	**12**	**L3**	**CO5**

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