

CBCS SCHEME

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BEC701

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2026

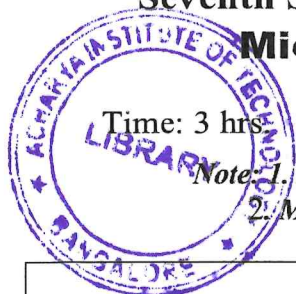
Microwave Engineering and Antenna Theory

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 : $R = 2\Omega/m$, $G = 0.5 \text{ m mho/m}$ $f = 1 \text{ GHz}$, $L = 8\text{nH/m}$, $C = 0.23\text{pF}$ 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

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 from 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
