

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022

Subject Code:2171001**Date:03-01-2023****Subject Name: Microwave Engineering****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) List the Microwave frequency bands.	03
	(b) What is reflection coefficient and VSWR for open circuit load and short circuit load? (Assume $Z_0=50\Omega$).	04
	(c) Discuss in brief advantages and application of Microwave.	07
Q.2	(a) Explain TE, TM and TEM modes.	03
	(b) A load impedance $Z_L = 100 \Omega$ is connected to a 50Ω lossless T.L. of 3 cm length and operated at 3 GHz. Find out, a) Reflection coefficient at load end b) Reflection coefficient at distance 3 cm from load c) VSWR d) Input impedance (Z_{in})	04
	(c) Draw the equivalent circuit of transmission line and derive basic equations for voltage and current of transmission line.	07
	OR	
(c) Derive Impedance transformation relationship for transmission line.	07	
Q.3	(a) Sketch Rectangular and Circular Waveguide. Compare their dominant mode.	03
	(b) Explain the quarter wave transform for impedance matching application.	04
	(c) Explain Magic Tee with its applications.	07
OR		
Q.3	(a) Define coupling factor, directivity & isolation factor for directional coupler.	03
	(b) Write short note on scattering parameters.	04
	(c) List various Microwave junction devices. Also Derive the scattering Matrix for a Series T-junction matched at arm - 3.	07
Q.4	(a) What is Transferred electron effect?	03
	(b) Draw schematic of four port circulator and explain its working.	04
	(c) Explain working of reflex klystron using Applegate diagram.	07
OR		
Q.4	(a) Explain the Gunn effect.	03
	(b) Explain the working of an Isolator.	04
	(c) Explain the working of Two cavity Klystron with help of neat labeled constructional diagram.	07
Q.5	(a) Brief note on microwave satellite system.	03
	(b) Describe the process to measure the noise figure at microwave frequencies.	04
	(c) Discuss the basic three laws for satellite communication systems.	07
OR		
Q.5	(a) Explain in brief Microwave imaging.	03
	(b) Explain Brief notes on any one Microwave Antenna.	04
	(c) Describe Microwave RADAR system.	07