Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (OLD) EXAMINATION – WINTER 2022

Subject Code:171001 Date:12-01-2023

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.**

Q.1	**(a)**	Describe the advantages of Microwave with its range and also prove "Microwave is said to be transparent"	**07**
	(b)	Derive necessary equations for voltage and current with reference to EM wave propagating along transmission line.	**07**
Q.2	**(a)**	What is standing wave pattern? Define VSWR in open and short circuited load.	**07**
	(b)	What is reflection coefficient? Define Reflection coefficient for open and short circuited load.	**07**
		OR	
	(b)	Write a short note on Microstrip line	**07**
Q.3	**(a)**	What is magic associate with magic tee junction? List two applications of magic TEE	**07**
	(b)	What is the purpose of Directional Coupler? Describe in detail the operation of a 2-hole directional coupler. Define coupling factor, directivity, isolation and insertion loss of Directional coupler and write expression for each.	**07**
		OR	
Q.3	**(a)**	What do you mean by non-reciprocal network? Define Faraday rotation in ferrites and explain (i) Isolator	**07**
	(b)	Explain the operation of E-plane Tee and derive s-parameter matrix for the same.	**07**
Q.4	**(a)**	What do you mean by favorable electrons? Draw cross sectional view of cavity magnetron and discus field inside the interaction gap.	**07**
	(b)	Describe the construction and working of a reflex klystron. Explain how velocity and current modulation takes place using the Applegate diagram.	**07**
		OR	
Q.4	**(a)**	Draw different slow wave structures and write why slow wave structures are used in traveling wave tubes? Also explain working of TWT with neat sketch	**07**
	(b)	Describe the construction of two cavity klystron with Applegate diagram and compare it with multi cavity klystron.	**07**
Q.5	**(a)**	Explain construction, characteristic and application of Gunn diode	**07**
	(b)	Explain the principle of Radar. Derive the equation of the range of Radar.	**07**
		OR	
Q.5	**(a)**	What is Tunneling effect? Explain the construction and working of Tunnel diode. What are the applications of Tunnel diode?	**07**
	(b)	Write a note on PIN diode and its applications	**07**

****