Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2024

Subject Code: 3171001 Date:22-05-2024

Subject Name: Microwave Theory and Techniques

Time:02:30 PM TO 05:00 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)**	What are microwaves? List down the microwave frequency bands.	**03**
	(b)	What is magic tee? What it is called as magic tee?	**04**
	(c)	What are TE, TM and TEM modes in rectangular waveguide? Explain why TEM mode cannot propagate through a rectangular waveguide.	**07**
Q.2	**(a)**	Explain the principal of Radar.	**03**
	(b)	What is S - Parameter? Discuss the properties of S- parameter.	**04**
	(c)	Enlist the applications of microwave and explain any two in detail.	**07**
		OR	
	(c)	Derive TE wave field equations for rectangular waveguide.	**07**
Q.3	**(a)**	Explain the effect of microwave on human body.	**03**
	(b)	Write a brief note on PIN diode.	**04**
	(c)	Write a short note on GUNN diode.	**07**
		OR	
Q.3	**(a)**	Define coupling factor, isolation and directivity of directional coupler.	**03**
	(b)	Explain the working of Faraday's rotation isolator.	**04**
	(c)	With neat diagram, explain the working of E - plane Tee. Also derive its S - matrix.	**07**
Q.4	**(a)**	What is microstrip line and strip line? Enlist various strip lines.	**03**
	(b)	Write a brief note on GPS	**04**
	(c)	With neat diagram, explain two - cavity klystron amplifier.	**07**
		OR	
Q.4	**(a)**	Explain Electromagnetic Interference and Microwave imaging.	**03**
	(b)	Explain planar antennas.	**04**
	(c)	List the various methods of measuring MW frequency. Explain any one.	**07**
Q.5	**(a)**	What is Low Noise Amplifier? How to design it?	**03**
	(b)	Explain MW imaging in brief.	**04**
	(c)	Write a short note on Microwave Amplifier design.	**07**
		OR	
Q.5	**(a)**	What are the advantages of MMIC over discrete circuits?	**03**
	(b)	Define spectrum analyzer and network analyzer. Which parameter is measured by them?	**04**
	(c)	List down different types of microwave antennas. Explain reflector antenna in detail.	**07**

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