

Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII EXAMINATION – SUMMER 2025

Subject Code:2171001

Date:19-05-2025

Subject Name: Microwave Engineering

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) Define the following terms: 1) VSWR 2) Characteristics Impedance 3) Degenerate Mode	03
(b) List the advantages of microwaves and explain each briefly.	04
(c) List the applications of microwaves and explain each briefly.	07
Q.2 (a) Why can the TEM mode not propagate through a hollow rectangular waveguide? Justify	03
(b) What is the S-Matrix? List the properties of the S-matrix.	04
(c) List the losses associated with microwave transmission and explain each briefly.	07
OR	
(c) Prove that the E-plane tee junction cannot be matched to all three arms simultaneously.	07
Q.3 (a) What are the advantages of double stub impedance matching over the single stub impedance matching?	03
(b) Write short-note on impedance matching using stub.	04
(c) Compare rectangular and circular waveguide in detail.	07
OR	
Q.3 (a) Define the following terms: 1) Coupling factor 2) Directivity 3) Isolation	03
(b) Write a short note on waveguide bands, corners, and twists.	04
(c) A transmission line has the following parameters: $R = 2 \Omega/m$, $G = 0.5 \text{ mmho/m}$, $L = 8 \text{ nH/m}$, $C = 0.23 \text{ pF}$, and $f = 1 \text{ GHz}$ Calculate the characteristic Impedance and the propagation constant.	07
Q.4 (a) Why the vessels in microwave oven should be of dielectric material? Justify.	03
(b) What are the problems associated with conventional tubes at microwave frequencies?	04
(c) List the applications of magic tee and explain any two applications in details.	07
OR	
Q.4 (a) Why the slow wave structures are used in a travelling wave tubes?	03
(b) List the applications of directional coupler and explain each in brief.	04
(c) Explain the two cavity klystron in detail.	07

- Q.5** (a) What are the EMI and the EMC? **03**
(b) Describe how velocity modulation and current modulation take place in a klystron. **04**
(c) List the impedance measurement methods at microwave frequency and explain any one method in detail. **07**

OR

- Q.5** (a) What is the microwave imaging? **03**
(b) Write a short-note on “effect of microwaves on human body” **04**
(c) Explain microwave radar system in detail. **07**
