

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII (OLD) EXAMINATION – WINTER 2023**

**Subject Code:2171001****Date:12-12-2023****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
<b>Q.1</b>	(a) Define Microwave frequencies. Enlist various frequency bands of microwave signals.	<b>03</b>
	(b) Briefly discuss TEM, TE and TM Modes for microwave transmission.	<b>04</b>
	(c) Sketch a Rectangular Waveguide and a Circular Waveguide and compare their dominant modes. Also, provide advantages and disadvantages associated with each waveguide types.	<b>07</b>
<b>Q.2</b>	(a) Discuss in brief applications of microwave.	<b>03</b>
	(b) Define:	<b>04</b>
	(i) Characteristic Impedance	
	(ii) VSWR	
(iii) Reflection coefficient		
(iv) Transmission coefficient		
(c) Why Scattering parameters are used for higher frequencies? Discuss the properties of S parameters of microwave devices in brief.	<b>07</b>	
<b>OR</b>		
	(c) Draw equivalent circuit of transmission line and derive basic equations for voltage and current on transmission line.	<b>07</b>
<b>Q.3</b>	(a) Write a brief note on parallel strip lines.	<b>03</b>
	(b) What is standing wave? Derive the equation of voltage standing wave ratio (VSWR) in terms of reflection coefficient.	<b>04</b>
	(c) Explain in detail Magic Tee with its applications.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Define the following:	<b>03</b>
	(i) Group Velocity	
	(ii) Phase Velocity	
(iii) Return Loss		
(b) Explain the role of spectrum analyzer in microwave measurements.	<b>04</b>	
(c) Define Klystron. Write short notes Two Cavity Klystron.	<b>07</b>	
<b>Q.4</b>	(a) Briefly explain the working of an Isolator.	<b>03</b>
	(b) Write a short note on any one Power measurement method at microwave frequency.	<b>04</b>
	(c) Explain in detail working of Gunn diode.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) Briefly explain electromagnetic interference.	<b>03</b>

- (b) Write a short note on effects of microwave on Human body. **04**
  - (c) Explain briefly different methods of Impedance Measurement at microwave frequency. **07**
- Q.5**
- (a) What is Remote sensing? List various applications of Remote sensing. **03**
  - (b) Write a short note on any one Microwave Antenna. **04**
  - (c) Write notes on Medical and Civil application of microwave. **07**

**OR**

- Q.5**
- (a) Discuss briefly Advantages of Microwaves. **03**
  - (b) Write a short note on Tunnel diode. **04**
  - (c) Write a short note on Radar Systems. **07**

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