Enrolment No./Seat No_____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE- SEMESTER–VII EXAMINATION – WINTER 2025**

**Subject Code:3171001 Date:20-11-2025**

**Subject Name:Microwave Theory and Techniques**

**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)** | Explain the terms: a) Reflection coefficient b) VSWR c) Return loss | **03** |
| | **(b)** | Discuss the limitation of transistor at microwave frequency. | **04** |
| | **(c)** | Discuss the advantages, demerits and applications of microwave signal. | **07** |
| **Q.2** | **(a)** | What is Microstrip lines? Explain in brief. | **03** |
| | **(b)** | Explain Directional Coupler with neat diagram. | **04** |
| | **(c)** | Write short note on IMPATT Diode . | **07** |
| | | **OR** | |
| | **(c)** | Write short note on schottky Barrier Diodes. | **07** |
| **Q.3** | **(a)** | What are the properties of S-parameters? Explain in brief. | **03** |
| | **(b)** | What is E plane Tee? Derive the S- parameter matrix for the same. | **04** |
| | **(c)** | What is microwave transistor? Discuss the key parameters and applications of it. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | What are TE, TM and TEM Mode? Explain with neat figures. | **03** |
| | **(b)** | What is Microwave Attenuator? Discuss the types of Attenuator. | **04** |
| | **(c)** | What is PIN diode? Discuss the Switching, Attenuation applications of PIN diode with key parameters of PIN Diode. | **07** |
| **Q.4** | **(a)** | What is impedance transformation? Explain in brief. | **03** |
| | **(b)** | What are the design steps of microwave Oscillator? Discuss in short. | **04** |
| | **(c)** | Explain the key parameters of design of Low Noise Amplifier (LNA). | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | What is microwave Mixer? Explain in short. | **03** |
| | **(b)** | Discuss the Network Analyzer and measurement of Scattering Parameters. | **04** |
| | **(c)** | Explain single cavity klystron as an Oscillator with neat diagram. | **07** |
| **Q.5** | **(a)** | Describe the double minima technique for VSWR measurement at microwave frequency. | **03** |
| | **(b)** | Discuss the Noise at microwave frequency and measurement of Noise Figure techniques. | **04** |
| | **(c)** | Explain the measurement of various microwave antenna parameters. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | What is GPS? Explain in brief. | **03** |
| | **(b)** | Discuss the Microwave Antennas with neat diagrams. | **04** |
| | **(c)** | Discuss the microwave Imaging with neat figure. | **07** |