Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VII (Old) EXAMINATION – WINTER 2019**

**Subject Code: 171001** **Date: 05/12/2019**

**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.**

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|---|---|---|---|
| **Q.1** | **(a)** | Discuss the advantages of microwave frequencies compare with low-frequency waves and list out the various applications of microwaves. | **07** |
| | **(b)** | Draw and explain equivalent circuit of a length $\Delta x$ of a transmission line at microwave frequencies. | **07** |
| **Q.2** | **(a)** | Describe the "Reflex Klystron" with the aid of suitable schematic diagram. Why the Transit Time is so important in this device. | **07** |
| | **(b)** | Write the advantages and disadvantages of rectangular waveguide over circular wave guide .List out the differences between the TE mode and TM mode. | **07** |
| | | **OR** | |
| | **(b)** | A transmission line has a characteristic impedance of $50 + j\ 0.01\ \Omega$ and is terminated in a load impedance of $73 - j\ 42.5\ \Omega$. Calculate: (a) the reflection coefficient; (b) the standing-wave ratio. | **07** |
| **Q.3** | **(a)** | What do you mean by stub? Explain impedance matching by use of stub with necessary circuit, waveforms and derivation. | **07** |
| | **(b)** | With neat sketch, explain the operation of Magnetron. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | What is magic associated with a Magic Tee ?Draw a neat sketch of a Magic Tee and list out its applications and properties | **07** |
| | **(b)** | Explain construction, characteristic and application of Gunn diode. | **07** |
| **Q.4** | **(a)** | Write a note on Directional coupler and its applications. Explain the terms Coupling factor and Directivity. | **07** |
| | **(b)** | What is Tunneling effect? Explain the construction and working of Tunnel diode. What are the applications of Tunnel diode? | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain the construction and working of IMPATT diode. What are its applications? | **07** |
| | **(b)** | With neat sketch, explain the operation of "Traveling Wave Tube". | **07** |
| **Q.5** | **(a)** | What do you mean by Doppler effect? Explain operation of MTI radar. | **07** |
| | **(b)** | Explain Basic Principal of "RADAR" and Derive the basic RADAR Range Equations | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Describe Microstrip line in detail. | **07** |
| | **(b)** | Explain "Farday Rotation Circulator" and "Y Circulator" with neat sketch | **07** |

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