

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII • EXAMINATION – WINTER • 2014****Subject Code: 171001****Date: 25-11-2014****Subject Name: Microwave Engineering****Time: 10:30 am - 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.

- Q.1 (a)** Explain advantages of microwave and its applications. Draw neat diagram of Microwave system. **07**
- (b)** Explain reflection coefficient of transmission line and standing wave. Derive expression for impedance and reflection coefficient at any point on the line. **07**
- Q.2 (a)** Sketch rectangular and circular waveguide. Compare their dominant mode. List advantages and disadvantages. **07**
- (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**
- OR**
- (b)** An air-filled circular waveguide has a radius of 2 cm and is to carry energy at a frequency of 10 GHz. Find all the TE_{np} and TM_{np} modes for which energy transmission is possible. **07**
- Q.3 (a)** Explain in detail applications of Magic Tee. **07**
- (b)** Explain with diagram waveguide band, corners and twist with their applications. **07**
- OR**
- Q.3 (a)** Sketch different directional couplers. Define coupling factor, directivity. **07**
- (b)** Explain in brief Microwave Circulators and Faraday – rotation isolator. **07**
- Q.4 (a)** Explain Working of reflex klystron. Compare it with cavity klystron. **07**
- (b)** Draw different slow-wave structures. Explain working of Traveling-wave tube. **07**
- OR**
- Q.4 (a)** List different types of Magnetron. Explain mechanism of oscillations of Magnetron Oscillator with diagram. **07**
- (b)** Explain working principles of Tunnel Diodes with Energy-band Diagrams. **07**
- Q.5 (a)** What is Gunn effect? Explain working of GaAs diode. **07**
- (b)** Define receiver noise. Explain radar range equation in terms of receiver noise figure, bandwidth and other related parameters. **07**
- OR**
- Q.5 (a)** Draw block diagram of pulse radar and explain each block. List different types of display used. **07**
- (b)** What do you mean by Doppler effect? Explain operation of MTI radar. **07**
