

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (OLD) EXAMINATION – WINTER 2018****Subject Code: 171001****Date: 06/12/2018****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.

- Q.1** (a) Define following : (i) Guide wave length (ii) Transmission coefficient (iii) Phase velocity (iv) Gunn effect (v) VSWR (vi) Return loss (vii) Characteristic impedance **07**
- (b) Describe the problems associated with conventional tubes at UHF and Microwave? **07**
- Q.2** (a) Explain reflection coefficient of transmission line and standing wave. Derive expression for impedance and reflection coefficient at any point on the line. **07**
- (b) A lossless line has a characteristic impedance of 50 Ω and is terminated in a load resistance of 75 Ω . The line is energized by a generator which has an output impedance of 50 Ω and an open-circuit output voltage of 30 V (rms). The line is assumed to be 2.25 wavelengths long. **07**
- Determine: a. The input impedance
b. The magnitude of the instantaneous load voltage
c. The instantaneous power delivered to the load
- OR**
- (b) Explain TE, TM and TEM modes in a waveguide. What is meant by the Dominant mode in a rectangular waveguide? Explain why TEM mode can't propagate through a rectangular waveguide. **07**
- Q.3** (a) List different types of Magnetron. Explain mechanism of oscillations of Magnetron Oscillator with diagram. **07**
- (b) Explain working of two cavity klystron with necessary diagram and waveforms. **07**
- OR**
- Q.3** (a) Explain the construction and working of IMPATT diode. What are its applications? **07**
- (b) With the aid of Diagram, explain the operation of "Two Hole Directional Coupler" **07**
- Q.4** (a) Write properties of smith chart and explain its application with any one example. **07**
- (b) Explain in detail E-plane Tee. With S-matrix prove that the Tee junction cannot be matched to all the three arms simultaneously. **07**
- OR**
- Q.4** (a) What is microstrip line? Derive equation of characteristic impedance and quality factor of microstrip line. **07**
- (b) Explain different display methods of RADAR. **07**
- Q.5** (a) Explain the principle of MTI radar with block diagram. **07**
- (b) Define Microwave. Write advantage, disadvantage and industrial application of microwave. **07**
- OR**
- Q.5** (a) Write short note on Circulators and isolators **07**
- (b) Write a note on any one of the following. **07**
- (1) Step Recovery Diode and its applications. (2) $\lambda/4$ Line and its applications.
