

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2017

Subject Code: 2171001

Date: 02/11/2017

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) Discuss in brief advantages and application of microwave. **03**
- (b) Define: (1) Characteristic Impedance **04**
(2) VSWR
(3) Reflection coefficient
(4) Transmission coefficient
- (c) Explain with merits and demerits of micro strip line, Also explain briefly parallel strip line. **07**
- Q.2**
- (a) Explain the impossibilities of TEM wave propagation through waveguide. **03**
- (b) Sketch circular and rectangular wave guide and compare it. **04**
- (c) Draw equivalent circuit of transmission line and derive basic equation for voltage and current on transmission line, Define characteristic impedance of Tx -line. **07**
- OR**
- (c) What is the importance of impedance matching? Explain single stub and double stub matching in brief. **07**
- Q-3**
- (a) Define coupling factor, directivity & isolation factor w.r.s.t directional coupler. **03**
- (b) Write all properties of Smith chart. **04**
- (c) A telephone line has $R = 6 \Omega/\text{km}$, $L = 2.2 \text{ mH}/\text{km}$, $C = 0.005 \mu\text{F}/\text{km}$, and $G = 0.05 \mu\text{mho}/\text{km}$. Determine Z_0 , α , β at 1 KHz. If the line length is 100 km, determine the attenuation and phase shift of the signal. Calculate the phase velocity of the signal. **07**
- OR**
- Q-3**
- (a) What is S-Matrix? What are the properties of S-Matrix? **03**
- (b) Draw schematic of four port circulator and explain its working, **04**
- (c) Draw and explain E-plane Tee. Derive its S-Matrix. **07**

- Q-4** (a) What is MMIC? Which materials are used for MMIC fabrication? **03**
 (b) Write a short note on Two Cavity Klystron. **04**
 (c) Explain construction, characteristic and application of Gunn diode. **07**
- OR**
- Q-4** (a) Write notes on Medical and Civil related application of microwave. **03**
 (b) Describe the working of a reflex klystron. **04**
 (c) Explain working of TRAPATT diode. Write its limitations and applications. **07**
- Q-5** (a) What are the problems associated to conventional tubes at microwave frequencies? **03**
 (b) Explain Brief notes on any one Microwave Antenna. **04**
 (c) Explain briefly different method of Impedance measurement at microwave frequency. **07**
- OR**
- Q-5** (a) Brief note on microwave satellite system. **03**
 (b) Write notes on Remote Sensing system. **04**
 (c) Explain Network Analyzer and how different scattering parameters are measured? **07**
