

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
(2) VSWR
(3) Reflection coefficient
(4) Transmission coefficient | 04 |
| (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**
