

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII EXAMINATION – WINTER 2015

Subject Code: 173201**Date: 12/12/2015****Subject Name: Microwave and Satellite Communication****Time: 10:30am to 1:00pm****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) Do as Directed: **07**
(i). State the application of Magic Tee. Explain any two applications in detail with diagram. (ii). State the reason why tubes or transistors cannot be used for UHF
- (b) Define the following terms: **07**
(i) Guide wavelength (ii) Klystrons (iii) Phase velocity (iv) Group velocity
- Q.2** (a) Derive wave equation for a TE wave and obtain all the field components in a rectangular waveguide. **07**
- (b) Line is matched if it is terminated in a load equal to its characteristic impedance (Z_0). With the help of reflection coefficient find out the equation of Z_0 when V_s and I_s will be in phase. **07**
- OR**
- (b) The dimension of a guide is 2.5×1 cms. The frequency is 8.6 GHz. Find the following: **07**
(a). Possible modes (b). cut-off frequencies (c). guide wavelength.
- Q.3** (a) A 50 ohm lossless line connects a signal of 300 KHz to a load of 100 ohm. If the load power is 50 mW; determine (i) VSWR (ii) Position of first V_{min} and V_{max} . (iii). V_{min} and V_{max} . (iv). Impedance at V_{min} and V_{max} . **07**
- (b) Define VSWR. What is impedance matching? Explain various methods of achieving impedance matching. **07**
- OR**
- Q.3** (a) Draw and explain the operation of Two cavity Klystron amplifier. Also state the applications of Reflex Klystrons. **07**
- (b) Draw and explain Physical construction of TWT and also draw schematic of electrode arrangement. **07**
- Q.4** (a) Explain the construction of Varactor diode with its equivalent circuit. Also explain the static figure of merit and state few applications. **07**
- (b) Draw and explain TTC&M system in satellite communication **07**
- OR**
- Q.4** (a) Only Draw constructions of below and List out the application of following devices **07**
IMPATT, TRAPATT, BARRITT
- (b) Define the following terms **07**
Perigee, Apogee, Mean Anomaly, Ascending node and descending node, Elevation angle, Eccentricity, Azimuth angle
- Q.5** (a) What are the advantages and limitations of RADAR system? Explain the block diagram of bistatic radar and monostatic radar. **07**
- (b) Two satellites are moving in an elliptical orbit with same perigee but different apogee distances. Satellite 1 is having an orbital period of 5 hours and semimajor axis, 20000 Km. while the orbital period of satellite 2 is 2 hours 50 min. Determine the semimajor axis of satellite. **07**

OR

- Q.5** (a) What are the general requirements for any radar system? Also explain CW radar and Pulsed Radar. **07**
- (b) Draw and Explain Doppler effect with respect to CW Doppler RADAR with its block diagram **07**
