

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**PDDC - SEMESTER-VII • EXAMINATION – WINTER 2013**

**Subject Code: X 71104****Date: 10-12-2013****Subject Name: Satellite Communication****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) State Kepler's three laws of planetary motion. Illustrate in each case their relevance to artificial satellites orbiting the earth. **07**
- (b) Explain what is meant by apogee height and perigee height. The Aussat 1 satellite in geostationary orbit has an apogee height of 35795 km and a perigee height of 35779 km. Determine the semimajor axis and eccentricity of satellite 's orbit assuming a value of 6378 km for the earth's equatorial radius. **07**
- Q.2** (a) An earth station is located at latitude 30 ° S and longitude 130° E. Calculate the antenna look angles for a satellite at 156° E. **07**
- (b) Explain what is meant by the earth eclipse of an earth-orbiting satellite. **07**
- OR**
- (b) How do we decide limits of visibility for an earth station? **07**
- Q.3** (a) Briefly describe the three- axis method of satellite stabilization. **07**
- (b) Explain what is meant by thermal control and why this is necessary in a satellite. **07**
- OR**
- Q.3** (a) Define and explain the terms roll, pitch and yaw. **07**
- (b) Briefly describe the equipment sections making up a transponder channel. **07**
- Q.4** (a) Describe and compare MATV and CATV systems. **07**
- (b) Calculate the gain of 3-m parabolic reflector antenna at a frequency of 6 GHz and 14 GHz. **07**
- OR**
- Q.4** (a) Two amplifiers are connected in cascade, each having a gain of 10 dB and a noise temperature of 200 K. Calculate the overall gain and the effective noise temperature referred to input. **07**
- (b) In a satellite link, the propagation loss is 200 dB. Margins and other losses account for another 3 dB. The receiver [G/T] is 11 dB and [EIRP] is 45 dBW. Calculate the received [C/N] for a system bandwidth of 36 MHz. **07**
- Q.5** (a) Compare uplink power requirements for FDMA and TDMA. **07**
- (b) What is pre-assigned TDMA? **07**
- OR**
- Q.5** (a) Briefly mention the operation of SPADE system of demand assignment. **07**
- (b) Describe the general operating principles of a TDMA network. **07**

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