Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M.E Sem-I Remedial Examination April 2010**

**Subject code: 710418** **Subject Name: Satellite Communication**

**Date: 09 / 04 / 2010** **Time: 12.00 noon – 02.30 pm**

**Total Marks: 60**

## Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| **Q.1** | **(a)** | Define and explain Kepler' First, Second and Third Law | **06** |
| | **(b)** | Give comparison of MATV and CATV systems | **06** |
| **Q.2** | **(a)** | Explain the concept of Link Power Budget calculation | **06** |
| | **(b)** | Describe SPADE system | **06** |
| | | **OR** | |
| | **(b)** | Define: [1] Antenna look angle [2] Apogee [3] Retrograde orbit [4] True anomaly [5] | **06** |
| **Q.3** | **(a)** | Explain Station keeping of satellite systems | **06** |
| | **(b)** | A satellite is orbiting in the equatorial plane with a period from perigee to perigee of 12 h. Given that the eccentricity is 0.002, calculate the semimajor axis. The earth's equatorial radius is 6378.1414 km. | **06** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain Spinning satellite stabilization | **06** |
| | **(b)** | Draw to scale the uplink and downlink channeling schemes for a 500-Mhz-bandwidth C-band satellite, accommodating the full complement of 36- Mhz-bandwidth transponders. Assume the use of 4-Mhz guardbands. | **06** |
| **Q.4** | **(a)** | Explain concept of transponder capacity for direct broadcast satellite services | **06** |
| | **(b)** | Explain Earth Eclipse of Satellite | **06** |
| | | **OR** | |
| **Q.4** | **(a)** | Describe On-Board Signal Processing for FDMA/TDM Operation | **06** |
| | **(b)** | Describe FDMA down link analysis | **06** |
| **Q.5** | **(a)** | Describe TT & C subsystem | **06** |
| | **(b)** | The orbit for an earth-orbiting satellite orbit has an eccentricity of 0.15 and a semimajor axis of 9000 km. Determine (a) its periodic time; (b) the apogee height; (c) the perigee height. Assume a mean value of 6371 km for the earth's radius. | **06** |
| | | **OR** | |
| **Q.5** | **(a)** | Write short note on various atmospheric losses | **06** |
| | **(b)** | Write short note on sun synchronous orbits | **06** |

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