**Seat No./Enrollment No.: _____**

# GUJARAT TECHNOLOGICAL UNIVERSITY
## BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

**Subject Code: 3161010** **Date: 01/06/2026**

**Subject Name: Satellite Communication**

**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.**
4. **Simple and non-programmable scientific calculators are allowed.**

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|---|---|---|---|
| **Q.1** | **(a)** | List advantages and disadvantages of satellite communication. | **03** |
| | **(b)** | Explain applications of satellite communication in different sectors. | **04** |
| | **(c)** | Explain the architecture of a satellite communication system with block diagram. | **07** |
| **Q.2** | **(a)** | State Kepler's laws of planetary motion. | **03** |
| | **(b)** | Differentiate between solar day and sidereal day. | **04** |
| | **(c)** | Explain orbital parameters: inclination, eccentricity, semi-major axis, RAAN, argument of perigee, true anomaly. | **07** |
| | | OR | |
| **Q.2** | **(c)** | Explain how solar day and sidereal day affect satellite ground track patterns. | **07** |
| **Q.3** | **(a)** | List major subsystems of a satellite. | **03** |
| | **(b)** | Explain power subsystem of a satellite. | **04** |
| | **(c)** | Explain TTC&M subsystem with block diagram and functions. | **07** |
| | | OR | |
| **Q.3** | **(a)** | What is station keeping? | **03** |
| | **(b)** | Write note on satellite antennas. | **04** |
| | **(c)** | Explain AOCS with sensors and actuators used. | **07** |
| **Q.4** | **(a)** | What is solar eclipse on satellite? | **03** |
| | **(b)** | Explain sun transit outage and its effects. | **04** |
| | **(c)** | Compare Doppler shift effects in GEO, MEO and LEO satellites and compensation methods. | **07** |
| | | OR | |
| **Q.4** | **(a)** | What is EIRP? | **03** |
| | **(b)** | Explain calculation of system noise temperature. | **04** |
| | **(c)** | Explain steps to prepare satellite link budget with uplink and downlink calculations. | **07** |
| **Q.5** | **(a)** | Define C/N ratio. | **03** |
| | **(b)** | Explain effect of rain attenuation on satellite link. | **04** |
| | **(c)** | Show relation between EIRP, flux density and received power with equations. | **07** |
| | | OR | |

**Q.5**

| | | |
|---|---|---|
| **(a)** | Define multiple access in satellite communication. | **03** |
| **(b)** | Compare ASK, FSK and PSK in terms of bandwidth and power efficiency. | **04** |
| **(c)** | Compare TDMA, FDMA and CDMA based on channel allocation and interference. | **07** |

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