

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 2171007

Date: 28/06/2023

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.

	MARKS
Q.1 (a) Define Followings:	03
a) Apogee	
b) Ascending node	
c) Inclination	
(b) Explain Satellite Communication with block diagram.	04
(c) An earth station is located at latitude of 12°S and longitude of 52°W . Calculate antenna-look angles for satellite at 70°W .	07
Q.2 (a) State only Kepler's three laws for planetary motion.	03
(b) Prove that radius of geostationary orbit is 42164.17 km provided that orbital time period is 23 h 56 min 4.09 seconds.	04
(c) Explain Telemetry, Tracking, and Command & Monitoring with neat sketch.	07
OR	
(c) Explain single conversion transponder with neat sketch.	07
Q.3 (a) Explain atmospheric losses.	03
(b) Explain Ionospheric effects.	04
(c) Formulate the equation of Rain Attenuation.	07
OR	
Q.3 (a) Discuss various types of antennas used in satellite communication.	03
(b) Derive the equation of received power in satellite communication.	04
(c) Explain XPD and XPI. Discuss the condition when both become equal.	07
Q.4 (a) Derive Equation of combined Uplink and Downlink Ratio.	03
(b) In Link budget calculation at 12 GHz, the free-space loss is 210 dB. The antenna pointing loss is 2 dB and the atmospheric absorption loss is 2 dB. The receiver [G/T] is 21.5 dB/K. The EIRP is 50 dBW. Calculate carrier-to-noise density ratio. [K] = -228.6 dB	04
(c) Why CDMA is known as spread spectrum technique in multiple access? Explain CDMA in detail.	07

OR

- Q.4** (a) Explain MATV system with block diagram. **03**
(b) A satellite at distance of 40000 km from point on earth's surface radiates a power of 15 W from an antenna with gain of 17 dB in the direction of observer. Find the flux density at receiving point, and power received by an antenna at this point with effective area of 11 m². **04**
(c) Explain error control in DBS-TV. **07**
- Q.5** (a) Distinguish Multiple Access and Multiplexing. **03**
(b) Sketch the block diagram of DBS TV Receiver. **04**
(c) Explain GPS position location principle. **07**
- OR**
- Q.5** (a) Explain VSAT. **03**
(b) Explain SPADE system. **04**
(c) Write short note on Iridium. **07**
