Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013

Subject code: 710418N **Date: 11-06-2013**

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)**	Describe the TT&C facilities of a satellite communications system.	**07**
	(b)	Define the following terms: (i) Argument of perigee (ii) Mean anomaly (iii) Inclination (iv) Prograde orbit (v) Perigee (vi) Right ascension of the ascending node (vii) True anomaly	**07**
Q.2	**(a)**	State Keplerôs three laws of planetary motion. Illustrate in each case their relevance to artificial satellites orbiting the earth.	**07**
	(b)	A geostationary satellite is located at 90^0 W. Calculate the azimuth angle for an earth station antenna at latitude 35° N and longitude 100° W.	**07**
		OR	
	(b)	Explain what is meant by the limits of visibility in relation to satellite communications. Show that for an earth station at equator, the longitude limit is given by +/-81.3 degree.	**07**
Q.3	**(a)**	Explain in detail the operation of the Spade system of demand assignment. What is the function of the common signaling channel.	**07**
	(b)	The uplink C/N_O ratio is 88 dBHz and downlink value is 78 dBHz. Calculate overall $C/N_{O.}$	**07**
		OR	
Q.3	**(a)**	With the aid of a block schematic, describe the functioning of a transmit-receive earth station used for telephonetraffic.	**07**
	(b)	Explain in detail Input and Output back-off in Power Amplifier.	**07**
Q.4	**(a)**	What is meant by apogee height and perigee height? Calculate apogee and perigee heights for a satellite orbit having following parameters: (a) radius of the orbit =7192.335 km. (b) eccentricity =0.0011501 (c) mean earth radius=6371 km	**07**
	(b)	Explain working of a transponder with the help of suitable block	**07**
		OR	
Q.4	**(a)**	Explain in detail Transmission Losses.	**07**
	(b)	In a link-budget calculation at 12 GH_Z, the free-space loss is 206 dB, the antenna pointing loss is 1 dB, and the atmospheric absorption is 2 dB.The receiver [G/T] is 19.5 dB/K, and receiver feeder losses are 1 dB The EIRP is 48 dBW.Calculate the carrier ï to-noise spectral density ratio.	**07**
Q.5	**(a)**	Describe the general operating principles of a TDMA network	**07**
	(b)	Determine the limits of visibility for an earth station situated at mean sea level, at latitude 48.72^0 north, and longitude 89.26^0 west. Assume a minimum angle of elevation of 5^0.	**07**
		OR	
Q.5	**(a)**	Describe and compare MATV and CATV systems.	**07**
	(b)	Describe the east-west and north-south station ï keeping maneuvers required in satellite station keeping.	**07**

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