Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1710418 **Date: 12/07/2012**

Subject Name: Satellite Communication

Time: 10:30 am – 13:00 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 and explain Kepler's third law. Find the height of a geostationary satellite .	**07**
	(b)	Explain the Keplerian element set.Give an example of a satellite with indicative values for these elements.	**07**
Q.2	**(a)**	Calculate the apogee and perigee heights for the orbit having 0.0011501 eccentricity, semi major axis of 7192.335 km and mean radius of earth is 6371 km.	**07**
	(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**
		OR	
	(b)	Determine the angle of tilt required for a polar mount used with an earth station at latitude 49 º N. Assume a spherical earth of mean radius 6371 Km and ignore earth station altitude. Draw relevant figure also.	**07**
Q.3	**(a)**	Discuss different power supplies used in space segment. Discussion should include the launching and eclipse also.	**07**
	(b)	Explain TT & C subsystem.	**07**
		OR	
Q.3	**(a)**	Briefly describe the equipment section making up a transponder channel.	**07**
	(b)	Explain channelization scheme for a 500-MHz satellite bandwidth.	**07**
Q.4	**(a)**	Explain what is meant by carrier-to- noise ratio? At the input to a receiver ,the received carrier power is 40 pW and the system noise temperature is 450 K. Calculate the Carrier-to-noise density ratio in dBHz. Given the bandwidth of 36 MHz, calculate C/N ratio in dB.	**07**
	(b)	Explain the TDMA system in satellite communications.	**07**
		OR	
Q.4	**(a)**	With the aid of a block schematic, describe the functioning of a transmit-receive earth station used for telephone traffic. Describe a multidestination carrier.	**07**
Q.4	**(b)**	Explain in detail the operation of the SPADE system of demand assignment. What is the function of the common signaling channel?	**07**
Q.5	**(a)**	Explain TWT input and output back-off in the power amplifier stage.	**07**
	(b)	Discuss importance of noise figure and noise temperature in the context of satellite circuits.	**07**
		OR	
Q.5	**(a)**	Explain how to compute uplink and downlink C/N ratios for a typical satellite link.	**07**
	(b)	What is DBS transmission? How does it differ from telecommunications satellite operation?	**07**

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