Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: X 71104 **Date: 01/01/2013**

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 look angle determination procedure.	**07**
	(b)	Determine the maximum and minimum range in kilometers from an earth station to a geosynchronous satellite. To what round-trip propagation times do these correspond ?	**07**
Q.2	**(a)**	List the factors which dominate the design of a satellite communication system.	**07**
	(b)	A satellite at a distance of 40000 km from a point on the earth's surface radiates a power of 2 W from an antenna with a gain of 17 dB in the direction of the observer. Find the flux density at the receiving point and the power received by an antenna with an effective area of $10\ m^2$.	**07**
		OR	
	(b)	Suppose we have a 4-GHz receiver with the following gains and noise temperatures: T_{in}= 50 K G_{RF} = 23 dB T_{RF} = 50 K G_m = 0 dB Tm = 500 K G_{IF} = 30 dB T_{IF} =1000 K Calculate the system noise temperature.	**07**
Q.3	**(a)**	Compare FDMA and TDMA in the context of satellite communications.	**07**
	(b)	Find the earth station transmitter power and received C/N when the system is operated : (i) In TDMA with the transponder saturated by each earth station in turn and (ii) In FDMA with 5-dB input and output backoff.	**07**
		OR	
Q.3	**(a)**	What is XPD ? How it is calculated ?	**07**
	(b)	How do we eliminate or alleviate propagation effects ?	**07**
Q.4	**(a)**	How does the VSAT system work?	**07**
	(b)	What are the coverage and frequency considerations for LEO satellite systems ?	**07**
		OR	
Q.4	**(a)**	How the design of DBS –TV link budget is done ?	**07**
	(b)	Explain how DBS –TV antennas are established.	**07**
Q.5	**(a)**	Explain operating principle of position location in GPS.	**07**
	(b)	Describe the operation of GPS receiver .	**07**
		OR	
Q.5	**(a)**	With a neat sketch, explain the mechanics of launching a satellite.	**07**
	(b)	Describe the operation of transponders .	**07**

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