Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2181007 Date: 02/05/2017

Subject Name: Satellite Commmunication(Departmental Elective - III)

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.**

Q.1	**(a)**	Explain LEO, MEO & GEO Satellite orbits with application.	**07**
	(b)	Define: Atmospheric Drag, Doppler effect and Satellite Payload.	**07**
Q.2	**(a)**	Explain the block diagram of Satellite Transponder. Also explain the frequency reuse technique for Transponder.	**07**
	(b)	For a satellite in a polar orbit, perigee height is 600 km and apogee height is 1200 km. Calculate the mean motion, rate of regression of nodes and rate of rotation of line of apsides. Assume radius of earth 6371 km.	**07**
		OR	
	(b)	An Earth station is located at latitude 12° S and longitude 52° W. Calculate the antenna look angles for a satellite at 70° W.	**07**
Q.3	**(a)**	A digital satellite communication link, with uplink frequency of 30 GHz transmits data at 1.0 Mbps. The downlink provides E_b/N_0 of 20dBs. The net uplink losses work out to 211.5 dBs. Determine the antenna diameter for the transmitting earth station to get overall E_b/N_0 of 17bBs, in optimal configuration assume following parameters: a. Transpower amplifier output of 200mW. b. Antenna efficiency of 60%. c. Satellite receiver antenna gain of 45 dBs. d. Satellite receiver noise power density of -169 dBm/Hz.	**07**
	(b)	What do you mean by multiple access technique? Explain Time Division Multiple Access in detail.	**07**
		OR	
Q.3	**(a)**	For a satellite earth station receiver with equivalent noise temperature of 200°K, a noise bandwidth of 18MHz and receiving antenna gain of 50dB, determine gain to equivalent noise temperature ration, noise density and total noise power. Assume carrier frequency of 12GHz.	**05**
	(b)	The EIRP from a satellite is 49.4 dB W then calculate power density at a ground station for which the range is 40,000 kms. The power delivered to the matched load at ground station receiver if the antenna gain is 50dB .The downlink frequency is 4GHz.	**02**
	(c)	With the help of equation and block diagram Properly explain the Code Division multiple Access in detail.	**07**

Q.4	**(a)**	Explain what is XPD? How XPD are predicted? Also Draw and Explain properly The Canting Angle and Tilt Angle with required equations.	**07**
	(b)	How the prediction of rain attenuation is possible? Also state the calculation steps of Long Term Statistics for NGSO System.	**07**

OR

Q.4	**(a)**	Explain Sun Synchronous orbits and Molniya orbit with their uses.	**07**
	(b)	List all seven operational NGSO constellation design and explain any two of them in detail.	**07**
Q.5	**(a)**	Write short notes on Master Control Station required for Direct Broadcast Satellite Television (DBS-TV) system.	**07**
	(b)	How the error control done in Digital DBS-TV? Explain it.	**07**

OR

Q.5	**(a)**	Write short notes on GPS Receivers with using simplified block diagram.	**07**
	(b)	What is GPS? Explain principle of GPS position location. Also explain signal generation in GPS.	**07**

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