GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VIII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2181007   **Date: 29/11/2018**

Subject Name: Satellite Communication

Time: 02:30 PM TO 05:00 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)**	Define: INTELSAT, INSAT and Altitude.	**03**
	(b)	Explain MEO & GEO Satellite orbits with application.	**04**
	(c)	Determine the height of Geostationary Orbit. Assume Radius of earth is 6378km.	**07**
Q.2	**(a)**	Define Atmospheric Drag, Doppler effect and Satellite trajectory.	**03**
	(b)	State and Explain Kepler's 3rd laws for planetary motion.	**04**
	(c)	Determine the antenna look angles for a satellite at 67° W. An earth station is located at latitude 35° N and longitude 100° W.	**07**

OR

	(c)	The Auss at 1 satellite in geostationary orbit has an apogee height of 35795 km and a perigee height of 35779 km. Assume a value of 6378 km for the earth's equatorial radius. Determine the semi-major axis and eccentricity of the satellite orbit.	**07**
Q.3	**(a)**	Explain the block diagram of Satellite Transponder.	**03**
	(b)	Explain the spade system in brief.	**04**
	(c)	A Satellite carrying a 11.7 GHz CW Beacon transmitter is positioned in geosynchronous orbit approximately 38,000 kms from the earth station with G/T of 19.7 dB/°K. The Beacon output power is 200mW and feeds the antenna with gain of 18.9 dB towards the earth station. The effective noise figure of the earth station receiver is 3.0 dB. Determine the strength of Beacon signal at the earth station. Assume T0=290°K.	**07**

OR

Q.3	**(a)**	List various types of control required to maintain the satellite in space.	**03**
	(b)	Explain the Code Division multiple Access in detail With the help of equation and block diagram Properly.	**04**
	(c)	What is uplink? Also Design all the steps to follow for Uplink power budget preparation.	**07**

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Q.4 **(a)** Define TDMA, FDMA & CDMA.   **03**

(b) Explain How the prediction of rain attenuation is possible?   **04**

(c) Explain the following satellite NGSO Systems (i) Teledesic (ii) Global star   **07**

OR

Q.4 **(a)** Define Frame Efficiency & Channel Capacity.   **03**

(b) Explain orbit, coverage and frequency consideration of nongeostationary satellite system.   **04**

(c) Explain Sun Synchronous and Molniya orbit with their uses.   **07**

Q.5 **(a)** Evaluate the equation for $[C/N_0]_D$ - Carrier to noise power density ratio in term of output back-off for the TWT amplifier used in a satellite.   **03**

(b) Draw the block diagram of DBS-TV receiver.   **04**

(c) Explain Master Control Station and DBS-TV uplink earth station in detail.   **07**

OR

Q.5 **(a)** Evaluate the equation for Carrier to Noise Power (C/N) ratio for downlink.   **03**

(b) Explain C/A code generator regarding GPS.   **04**

(c) Explain the GPS Receiver Operation in detail.   **07**

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