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

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2171007 **Date: 02/05/2017**

Subject Name: Satellite Communication(Departmental Elective - II)

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)**	Write few significant details of satellites: 1] Sputnik 2] INTELSAT	**07**
	(b)	With a diagram, justify the state of "Free Fall" of a satellite body.	**07**
Q.2	**(a)**	A satellite in orbit has got an orbital period of a solar day. Calculate the radius of the orbit. An observer on earth sees that the satellite is drifting. Find the rate of drift of the sub satellite point around the equator in degrees per solar day. Conclude whether the satellite is moving eastwards or westwards.	**07**
	(b)	Using a neat sketch, show and explain (1) Circular orbit (2) Elliptical orbit (3) Equatorial orbit (4) Inclined orbit (5) Polar orbit (6) GEO orbit (7) Molniya orbit	**07**
		OR	
	(b)	Classify orbits based on their height and specify at least one application of each.	**07**
Q.3	**(a)**	What is the significance of a Transponder in Satellite? Explain in details.	**07**
	(b)	Define an AKM. What is the use of this unit in a launch vehicle?	**07**
		OR	
Q.3	**(a)**	Explain in details about reliability and redundancy of satellite subsystems.	**07**
	(b)	Differentiate amongst TDMA, FDMA and CDMA systems.	**07**
Q.4	**(a)**	Write a short note on different antennas used in satellites.	**07**
	(b)	How does a spinner satellite operate? Explain the principle of North South control of a spinner satellite using IR sensors.	**07**
		OR	
Q.4	**(a)**	Classify the typical satellite antenna coverage zones to show different types of beams using diagram.	**07**
	(b)	How does a 3 axis stabilized satellite operate? Explain how attitude control is done.	**07**

Q.5	**(a)**	Using diagrams, explain the stratiform and convective rain events. An earth station at sea level communicates at an elevation angle of 35 degrees with a GEO satellite. The melting level height of the stratiform rain is 3 km. (melting layer is the region of the atmosphere where temperature changes from below 0°C to above 0°C). Find the physical path length through the rain.	**07**
	(b)	Write a short note on DBS TV systems.	**07**

OR

Q.5	**(a)**	Define canting angles and tilt angles for a rain drop. Calculate the perceived polarization tilt angle at an earth station located at 52°N, 1°E, for a vertically polarized signal transmitted from a GEO satellite located at 60°E?	**07**
	(b)	Write a short note on GPS.	**07**

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