Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3170114 Date:19-11-2024

Subject Name: Space Flight Mechanics

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What is space?	**03**
	(b)	Write difference between circular and elliptical orbit.	**04**
	(c)	Derive formula to calculate eccentricity as a function of the difference between K.E & P.E.	**07**
Q.2	**(a)**	Explain zero potential energy configurations.	**03**
	(b)	State and Prove Kepler's 2nd law.	**04**
	(c)	Write a short note Escape Velocity.	**07**
		OR	
	(c)	Explain Kepler's 3rd law to calculate the period of Mars. If The period of revolution of the earth about the sun is 365.256 days. The semi major axis of the earth's orbit is 1.49527 x 10^11 m and for mars it is 2.2783 x 10^11 m.	**07**
Q.3	**(a)**	Explain Different types of Space Vehicles.	**03**
	(b)	Explain The Two body problem.	**04**
	(c)	Derive Orbit equation.	**07**
		OR	
Q.3	**(a)**	What are the different phases of space mission?	**03**
	(b)	Write circular orbit equation and its importance.	**04**
	(c)	Explain yo-yo mechanism theory.	**07**
Q.4	**(a)**	What is gyrostat?	**03**
	(b)	State and prove Kepler's 3rd law.	**04**
	(c)	Explain double dip re entry.	**07**
		OR	
Q.4	**(a)**	What do you mean by Deep space?	**03**
	(b)	Write a note on skip reentry dynamics.	**04**
	(c)	Explain Hohmann transfer ellipse.	**07**
Q.5	**(a)**	What is Attitude maneuvering?	**03**
	(b)	Write a short note on Rigid body.	**04**
	(c)	Explain non spinning satellite of attitude control.	**07**
		OR	
Q.5	**(a)**	Define Entry heating.	**03**
	(b)	Explain steep ballistic reentry.	**04**
	(c)	Write a short note on dual spin satellite.	**07**

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