Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3170114 Date:16-01-2023

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)**	Is there gravity in space? Justify.	**03**
	(b)	Explain Newton's Law of Gravitation.	**04**
	(c)	Write a short note Escape Velocity.	**07**
Q.2	**(a)**	What is space?	**03**
	(b)	Explain Different types of Space Vehicles.	**04**
	(c)	Explain The Two body problem.	**07**
		OR	
	(c)	Derive Orbit equation.	**07**
Q.3	**(a)**	Derive the external force acting on rigid body by using Newton's second law of motion.	**03**
	(b)	Explain Gravitational potential energy.	**04**
	(c)	Derive formula to calculate eccentricity as a function of the difference between K.E & P.E.	**07**
		OR	
Q.3	**(a)**	What are the different phases of space mission?	**03**
	(b)	State and Prove Kepler's 2nd law.	**04**
	(c)	Explain Hohmann transfer ellipse.	**07**
Q.4	**(a)**	Write difference between circular and elliptical orbit.	**03**
	(b)	State and prove Kepler's 3rd law.	**04**
	(c)	Write a short note on Rigid body.	**07**
		OR	
Q.4	**(a)**	Explain zero potential energy configurations.	**03**
	(b)	Write a note on skip reentry dynamics.	**04**
	(c)	Write a short note on dual spin satellite.	**07**
Q.5	**(a)**	What is Attitude maneuvering?	**03**
	(b)	Explain steep ballistic reentry..	**04**
	(c)	What are the different types of Entry Paths? Explain any one in detail.	**07**
		OR	
Q.5	**(a)**	What is gyrostat?	**03**
	(b)	Explain non spinning satellite of attitude control.	**04**
	(c)	Define Entry heating. Derive an expression for aerodynamic heating rate.	**07**

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