Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170114 Date:14/06/2022

Subject Name:Space Flight Mechanics

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

			MARKS
Q.1	**(a)**	What is Space? Is there gravity in space?	**03**
	(b)	Explain Newton's law of gravitation in detail.	**04**
	(c)	Briefly classify Space vehicles.	**07**
Q.2	**(a)**	Explain Mechanics of Circular Orbit.	**03**
	(b)	What is zero potential energy configuration?	**04**
	(c)	Derive Orbit equation.	**07**
		OR	
	(c)	Explain the Concept of Entry Corridor.	**07**
Q.3	**(a)**	Explain Entry heating.	**03**
	(b)	Write difference between Elliptical and Circular orbit.	**04**
	(c)	Explain India's Mars Orbiter Mission in your own words.	**07**
		OR	
Q.3	**(a)**	Explain Escape velocity. Calculate the same for an object escaping from the earth's surface.	**03**
	(b)	State and Prove Kepler's 3rd law.	**04**
	(c)	Explain The Two body problem.	**07**
Q.4	**(a)**	Define energy.	**03**
	(b)	Derive an equation foe an eccentricity in terms of the difference between kinetic and potential energy.	**04**
	(c)	Explain different types of entry paths.	**07**
		OR	
Q.4	**(a)**	What is Attitude maneuvering?	**03**
	(b)	With neat sketches explain different space trajectories and its physical significance.	**04**
	(c)	Write a short note on Hohmann transfer ellipse.	**07**
Q.5	**(a)**	Explain the concept of Rigid body in short.	**03**
	(b)	What are the functions of (a) Heat Shield & (b) Back Shell?	**04**
	(c)	From orbit equation, derive formula to calculate eccentricity in terms of the difference between kinetic energy and potential energy.	**07**
		OR	
Q.5	**(a)**	What do you mean by Deep space?	**03**
	(b)	State and prove Kepler's 2nd law.	**04**
	(c)	Establish a relation between Impulse and change in momentum.	**07**

****