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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2018

Subject Code: 2180103 **Date: 30/04/2018**

Subject Name: Space Dynamics

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.**

Q.1	**(a)**	What is Space? Why the dynamics of space objects are important to study?	**03**
	(b)	Is there gravity in Space? Yes or No. Explain in detail.	**04**
	(c)	Explain different types of entry paths.	**07**
Q.2	**(a)**	What are the different phases of Space mission?	**03**
	(b)	Explain zero potential energy configurations.	**04**
	(c)	Derive Angular momentum and Energy using wheel and axle theory.	**07**
		OR	
	(c)	Find the values of velocity required to obtain a circular orbit and parabolic trajectory for earth.	**07**
Q.3	**(a)**	Explain different types of space vehicles.	**03**
	(b)	Write difference between Elliptical and Circular orbit.	**04**
	(c)	Write a note on Elliptic orbit.	**07**
		OR	
Q.3	**(a)**	Explain initial stages of any space mission.	**03**
	(b)	Explain the Concept of Entry Corridor.	**04**
	(c)	Explain mechanics of Circular orbit. Also list important points for the same.	**07**
Q.4	**(a)**	Define Entry heating.	**03**
	(b)	What do you mean by Rigid Body?	**04**
	(c)	Derive general equation of motion for a vehicle entering the atmosphere.	**07**
		OR	
Q.4	**(a)**	What is Gyrostat?	**03**
	(b)	Explain the working of Rotor and Platform with neat sketch.	**04**
	(c)	Derive an expression for aerodynamic heating rate.	**07**
Q.5	**(a)**	What do you mean by dual spin satellite?	**03**
	(b)	Comment on Two body problem.	**04**
	(c)	Explain the working of dual spin satellite with neat sketch.	**07**
		OR	
Q.5	**(a)**	What do you mean by Deep space?	**03**
	(b)	What is Escape velocity of Spacecraft?	**04**
	(c)	From orbit equation, derive formula to calculate eccentricity in terms of the difference between kinetic energy and potential energy.	**07**

****