

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII(NEW) EXAMINATION – SUMMER 2019****Subject Code:2180103****Date:09/05/2019****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.

		MARKS
Q.1	(a) Define Space. How physical fundamentals for space vehicle are different from those associated with airplanes?	03
	(b) Classify Space vehicles.	04
	(c) With neat sketch explain different phases of space mission.	07
Q.2	(a) Write a note on Gravitational potential energy.	03
	(b) With neat sketch explain terminology of elliptic orbit.	04
	(c) Explain Newton's law of gravitation in detail.	07
OR		
	(c) Define Attitude Maneuver. How to measure it? Explain any one method of its measurement?	07
Q.3	(a) Explain Entry heating.	03
	(b) Derive an equation to calculate aerodynamic heating rate.	04
	(c) Derive general equation of motion for a vehicle entering the atmosphere.	07
OR		
Q.3	(a) Explain Escape velocity.	03
	(b) Compare Slender body and blunt body for entry heating performance.	04
	(c) Explain briefly magnetic disturbance torque acting on vehicle revolving in earth's orbit.	07
Q.4	(a) Explain zero potential energy configuration.	03
	(b) Explain Kepler's 1 st and 2 nd laws.	04
	(c) Explain different types of entry paths.	07
OR		
Q.4	(a) Calculate escape velocity required for a body to escape from the earth's atmosphere.	03
	(b) With neat sketches explain different trajectories and its physical significance.	04
	(c) Using Newton's Law of motion derive, $F_e = M \times \frac{d^2 r_c}{dt^2}$, Where r_c = Position of center of mass	07
Q.5	(a) Write a note on mechanics of circular orbits.	03
	(b) Derive an equation for eccentricity in terms of the difference between kinetic and potential energy.	04
	(c) Write a note on N-body problem.	07
OR		
Q.5	(a) Explain the concept of Rigid body	03
	(b) State and prove Kepler's 3 rd law.	04
	(c) Write a short note on Hohmann transfer ellipse.	07
