

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019****Subject Code: 2180103****Date: 21/11/2019****Subject Name: Space Dynamics****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.

	<b>MARKS</b>
<b>Q.1</b> (a) Is there gravity in space? Justify.	<b>03</b>
(b) Explain Newton's law of gravitation in detail.	<b>04</b>
(c) Define Space. Classify types of space vehicles.	<b>07</b>
<b>Q.2</b> (a) Explain Mechanics of Circular Orbit.	<b>03</b>
(b) State and Prove Kepler's 3 <sup>rd</sup> law.	<b>04</b>
(c) With neat sketch explain different types of space trajectories.	<b>07</b>
<b>OR</b>	
(c) Explain The Two body problem.	<b>07</b>
<b>Q.3</b> (a) State and Prove Kepler's 2 <sup>nd</sup> law.	<b>03</b>
(b) Explain Zero potential energy configurations.	<b>04</b>
(c) Derive Orbit equation.	<b>07</b>
<b>OR</b>	
<b>Q.3</b> (a) What is Escape Velocity? Calculate the same for an object escaping from the earth's surface.	<b>03</b>
(b) Write a note on Elliptic orbit.	<b>04</b>
(c) With neat sketch explain The Hohmann transfer ellipse.	<b>07</b>
<b>Q.4</b> (a) What is Attitude maneuvering?	<b>03</b>
(b) Why the stability of Satellite is very important? Write methods for stability control of satellites.	<b>04</b>
(c) What are the major sources of Attitude disturbance torques? Explain any one in detail.	<b>07</b>
<b>OR</b>	
<b>Q.4</b> (a) Establish a relation between Impulse and change in momentum.	<b>03</b>
(b) What do you mean by Dual spin satellite? Explain the functions of Rotor & Platform with labeled diagram.	<b>04</b>
(c) Write a short note on Yo-Yo Mechanism.	<b>07</b>
<b>Q.5</b> (a) What is (a) Re-entry corridor (b) Overshoot boundary & (c) Undershoot boundary?	<b>03</b>
(b) How Re-entry is more important in (a) Ballistic missiles (b) Planetary entry probes & (c) Manned spacecraft.	<b>04</b>
(c) Explain Motion of Re-entry objects using Motion Analysis Process (MAP).	<b>07</b>
<b>OR</b>	
<b>Q.5</b> (a) How re-entry mission is designed? Explain using block diagram.	<b>03</b>
(b) What are the functions of (a) Heat Shield & (b) Back Shell?	<b>04</b>
(c) Compare a study between Sphere, Cone & Blunted cone. And prove using parameters like Deceleration, Heat rate, Accuracy why Blunted cone shape is preferable for Re-entry vehicle design.	<b>07</b>

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