

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII (OLD) - EXAMINATION – SUMMER 2017

Subject Code:180103

Date:29/04/2017

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) Define Space. Classify Space vehicles. **07**  
(b) Explain Newton's law of gravitation in detail. **07**
- Q.2** (a) i. Is there gravity in Space? Yes or No. Explain in detail. **07**  
ii. Which are the different phases of Space mission?  
(b) i. Find velocities required to obtain a circular orbit and parabolic trajectory for earth. **07**  
ii. Explain zero potential energy configuration.
- OR**
- (b) Write a note on the Two-body problem. **07**
- Q.3** (a) Derive Orbit equation. **07**  
(b) Using orbit equation, derive formula to calculate eccentricity in terms of the difference between kinetic energy and potential energy. **07**
- OR**
- Q.3** (a) Prove that the squares of periods of any two satellites about the same planet are directly proportional to the cube of length of their semi major axis. **07**  
(b) Write a note on Elliptic orbit. **07**
- Q.4** (a) Derive general equation of motion for a vehicle entering the atmosphere. **07**  
(b) Explain Entry heating. Also obtain an equation for aerodynamic heating rate. **07**
- OR**
- Q.4** (a) Write a note on Deep Space. **07**  
(b) Write a short note on Hohmann transfer ellipse. **07**
- Q.5** (a) Write a note on Circular orbit. Make necessary comments. **07**  
(b) Define and discuss Escape Velocity. **07**
- OR**
- Q.5** (a) Explain different types of entry paths. **07**  
(b) With neat sketches explain different trajectories and its physical significance. **07**

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