



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**
