

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (NEW) - EXAMINATION – SUMMER 2017****Subject Code: 2180103****Date: 04/05/2017****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) Explain different types of entry paths. **07**
 (b) With neat sketches explain different trajectories and its physical significance. **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 the values of velocity required to obtain a circular orbit and parabolic trajectory for earth. **07**
 ii. Explain zero potential energy configuration.
- OR**
- (b) Derive Angular momentum and Energy using wheel and axle theory. **07**
- Q.3** (a) What is Gyrostat? Explain the working of Rotor and Platform with neat sketch. **07**
 (b) From 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) Write a note on Entry Heating. **07**
- OR**
- Q.4** (a) Write a note on the Two-body problem. **07**
 (b) Write a short note on Minimum energy path for interplanetary mission. **07**
- Q.5** (a) Write a note on Circular orbit. Make necessary comments. **07**
 (b) Write a note on Escape Velocity. **07**
- OR**
- Q.5** (a) What do you mean by Rigid Body? Obtain the following equation of external force acting on rigid body using Newton's law of motion. **07**

$$F_e = M \times (d^2r_c) / (dt^2)$$
 Where, r_c = Position of centre of mass
 (b) What do you mean by Dual Spin Satellite? Explain the working of it with neat sketch. **07**
