Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VSEMESTER B.TECH. (AERONAUTICAL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2018

SUBJECT: ORBITAL MECHANICS [AAE 4012]

REVISED CREDIT SYSTEM
(30/12/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A.	What is meant by rectilinear ellipse? Analyze its properties	**2**
1B.	Analyze the relative acceleration formula in detail.	**3**
1C.	Derive and analyze Kepler's law of periods from fundamentals.	**5**
2A.	What do you mean by Kepler's equation? Comment on its significance.	**2**
2B.	Explain the procedure to calculate orbital elements from state vectors.	**3**
2C.	A geocentric elliptical orbit has a perigee radius of 9600 km and an apogee radius of 21,000 km. Calculate the time to fly from perigee to a true anomaly of 120 degrees.	**5**
3A.	Explain the term orbit phase with necessary diagrams.	**2**
3B.	Explain Gibb's method of orbit determination from fundamentals.	**3**
3C.	Calculate the total delta-v required for a Hohmann transfer from a circular orbit of radius r to a circular orbit of radius 12r.	**5**
4A.	Examine the term synodic period in detail.	**2**
4B.	Examine interplanetary Hohmann transfer with necessary diagrams and equations.	**3**
4C.	Derive and examine the equation for calculating sphere of influence from fundamentals.	**5**

5A. What are the perturbing factors affecting RAAN of an orbit. **2**

5B. Discuss the issues caused by space debris with possible solutions. **3**

5C. Analyze the various causes and effects of orbital perturbation in detail. **5**