B.Tech. AEROSPACE ENGINEERING (BTAE)

Term-End Examination

December, 2017

BAS-025 : SPACE DYNAMICS

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt any seven questions.*
(ii) All questions carry equal marks.

1. Explain the following terms with the help of neat diagrams : **5x2=10**
   (a) Synodic time
   (b) Swing - by flights
   (c) Rendezvous mission
   (d) Baker's equation
   (e) Lambert's theorem

2. Explain the launch site and launch azimuth velocity penalty by making use of a plot. **10**

3. What do you understand by the term "re-entry" ? Explain in brief all the features of entry trajectory of a ballistic missile. **10**

4. Explain the reference frame where sun is taken as origin and compare it with the reference frames usually considered for satellite orbits. **10**

5. Sketch the velocity hodographs for elliptic, parabolic and hyperbolic motion and explain them in detail. 10

6. (a) How can one estimate the classical elements of an orbital from single radar sighting? 5+5
   (b) Derive and explain Kepler's third law.

7. (a) Discuss the launch opportunities for an interplanetary mission, with the help of a suitable diagram. 5+5
   (b) Explain fast interplanetary trajectories.

8. Discuss the following in brief : 5+5
   (a) Axis of the Ecliptic.
   (b) Vernal Equinox and Autumnal Equinox.

9. What are the phases of a ballistic missile ? Explain with the help of a neat diagram. 10

10. Explain the source of perturbations for an earth satellite system. 10