

**B.Tech. AEROSPACE ENGINEERING
(BTAE)**

Term-End Examination

June, 2015

00626

BAS-025 : SPACE DYNAMICS

Time : 3 hours

Maximum Marks : 70

Note : *Question no. 1 is compulsory. Attempt any six questions from questions no. 2 to 9.*

1. Explain the following terms with the help of neat diagrams : 5×2=10
 - (a) Synodic time
 - (b) Swing-by flights
 - (c) Rendezvous mission
 - (d) Baker's equation
 - (e) Lambert's theorem

2. (a) Discuss the space environment peculiarities. 5
(b) Explain the different layers of Earth's atmosphere. 5

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

4. (a) Derive and explain the significance of Jacobi integral. 5
- (b) How does one estimate the orientation of trajectory plane for a ballistic missile? 5
5. (a) Discuss the launch opportunities for an interplanetary mission, with the help of a suitable diagram. 5
- (b) Explain fast interplanetary trajectories. 5
6. Derive and explain the relation between position and time for a hyperbolic orbit. 10
7. For a 2-body problem, semi-latus rectum depends on angular momentum and semi-major axis depends on specific mechanical energy. Derive and explain. 10
8. Discuss the following in brief :
- (a) Axis of the Ecliptic 5
- (b) Vernal Equinox and Autumnal Equinox 5
9. Explain the following in brief :
- (a) Time of flight 5
- (b) Flight path angle 5
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