

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

Term-End Examination

June, 2019

BAS-025 : SPACE DYNAMICS

Time : 3 hours

Maximum Marks : 70

- Note :* (i) *Attempt any seven questions.*
(ii) *All questions carry equal marks.*
(iii) *Use of scientific calculator is permitted.*

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1. Explain the launch site and launch azimuth velocity penalty by making use of a plot. 10
 2. Prove that optimum interplanetary trajectory is a heliocentric ellipse, tangential to both the earth's orbit and to the target planet's orbit. 10
 3. Explain the following in brief : 10
 - (a) Axis of the ecliptic
 - (b) Vernal equinox and Autumnal equinox
 4. With the help of suitable diagram, explain the difference between chemical rocket propulsion and electrical rocket propulsion systems used for space craft flights. 10

5. (a) Derive the equation of orbit for a space craft moving in the gravitational field of the earth. 5+5
(b) Explain the various approximate models of motion that are used to study the motion of a space craft.
6. Describe Cowell's method and Encke's method in detail. 10
7. Explain the following : 5+5
(a) Time of flight
(b) Flight path angle
8. Sketch the velocity hodographs for elliptic, parabolic and hyperbolic motion and explain them in detail. 10
9. Explain the following terms : 5x2=10
(a) Capture radius
(b) Escape velocity
(c) Liberation points with location for Earth-moon system
(d) Phases of a ballistic missile
(e) Hohmann trajectory for interplanetary transfer.
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