

Unit 7 - Week 5: Flight Trajectory & Elements of Orbital Mechanics

Course outline

How to access the portal?

Week-0

Week 1: Introduction to Rocket Engines & Governing Equations

Week 2: Thermochemistry,Thrust Equation & Performance Parameters of Rocket Engine

Week 3: Nozzle Characteristics

Week 4: Characteristic Parameters of Rocket Nozzle

Week 5: Flight Trajectory & Elements of Orbital Mechanics

- Lecture 21: Flight Performance of a Rocket Vehicle
- Lecture 22: Flight Trajectory of Single Stage Rocket Vehicle
- Lecture 23: Orbital Mechanics
- Lecture 24: Types of Orbits
- Lesson 25: Orbital & Escape Velocity
- Quiz : Week 5: Assignment
- Week 5: Assignment Solution
- Feedback For Week 5

Week 6: Types of Propellant & its Selection, Multi-staging of rocket and SRPE

Week 7: Solid, Liquid & Composite Propellant Rocket Engine, Burning and Flame Structure

Week 8: Solid Propellants: Characteristics & Regression Rate Relation

Week 9: Evolution of Burning surface, Ignition System of Solid Propellant Grains, Types of Liquid Propellant Rocket Engine and Injection System

Week 10: Liquid Propellant Rocket Engines: Injection system, Atomization, Combustion Process and Feed System

Week 11: Feed System, Ignition System, Combustion Instability & Cooling System in LPRE

Week 12: Hybrid Propellant Rocket Engine and Non-chemical Rocket Engine

Week 5: Assignment

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-04, 23:59 IST.

- 1) Coasting height is the height attained by the rocket vehicle just before the complete burnout. Given statement is: 1 point
- True
 False
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
False
- 2) All geostationary orbits are also geosynchronous but not all geosynchronous orbits are geostationary. This statement is: 1 point
- True
 False
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
True
- 3) The cube of time period of revolution of a planet around sun in an elliptical orbit is directly proportional to the square of it semi-major axis. Given statement is: 1 point
- True
 False
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
False
- 4) A satellite of mass 35 kg is revolving in a circular orbit of moon at an altitude of 100 km. The ratio of escape velocity to orbital velocity for this satellite would be: 1 point
- 1:1.41
 2.21:1
 1:2.21
 1.41:1
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
1.41:1
- 5) Which of the following variable does not affect the speed of satellite orbiting in a circular orbit around a planet 1 point
- mass of the satellite
 mass of the planet
 altitude of the orbit
 radius of the planet
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
mass of the satellite
- 6) When the satellite moves in the opposite direction in which earth rotates in equatorial plane ; this type of orbit is known as: 1 point
- Equatorial orbit
 Retrograde equatorial orbit
 Polar orbit
 Geostationary orbit
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Retrograde equatorial orbit
- 7) Which of the following orbit is useful for satellite in order to locate the position of natural disasters such as storm & hurricanes: 1 point
- Equatorial orbit
 Retrograde equatorial orbit
 Polar orbit
 Geostationary orbit
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
Geostationary orbit
- 8) The velocity of a satellite orbiting the earth in a circular orbit at an altitude of 300 km above the earth surface is: (Consider $GM_e=398600 \text{ km}^3/\text{s}^2$, $R_e=6400 \text{ km}$) 1 point
- 6.3 km/s
 7.7 km/s
 8.3 km/s
 10.2 km/s
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
7.7 km/s
- 9) The period of revolution of a satellite orbiting the earth in a circular orbit of radius 7000 km from the earth center is: (Consider $GM_e=398600 \text{ km}^3/\text{s}^2$, $R_e=6400 \text{ km}$) 1 point
- 5829 s
 15437 s
 8545 s
 19435 s
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
5829 s
- 10) Which of the following expression correctly represents the relation between angular velocity (ω) of a satellite and radius of orbit (R): 1 point
- $\omega \propto 1/R^2$
 $\omega \propto 1/R^3$
 $\omega \propto 1/R$
 $\omega \propto 1/R^{1.5}$
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
 $\omega \propto 1/R^{1.5}$
- 11) The value of escape velocity on the surface of a planet having radius of 1200 km and gravitational acceleration on the surface of planet, 1.8 m/s^2 : 2 points
- 11.22 km/s
 5.68 km/s
 2.08 km/s
 8.58 km/s
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
2.08 km/s
- 12) A satellite is revolving in an elliptical orbit around the earth which passes through perigee altitude of 300 km with velocity of 9.2 km/s. Then, the apogee altitude and velocity at that point are: (Consider $GM_e=398600 \text{ km}^3/\text{s}^2$, $R_e=6378 \text{ km}$) 3 points
- 9893 km & 4.54 km/s
 7800 km & 4.54 km/s
 7800 km & 3.78 km/s
 9893 km & 3.78 km/s
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
9893 km & 3.78 km/s
- 13) An artificial satellite is revolving around a planet in an elliptical orbit of eccentricity, 0.2 with the velocity, 1.2 km/s at an altitude of 1680 km. The velocity of the satellite at it's perigee and apogee would be: (Consider $GM=4900 \text{ km}^3/\text{s}^2$, $R=1740 \text{ km}$) 3 points
- 1.46 km/s & 0.66 km/s
 1.46 km/s & 0.98 km/s
 2.14 km/s & 0.98 km/s
 2.14 km/s & 0.66 km/s
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
1.46 km/s & 0.98 km/s
- 14) The total mass of a planet is 0.05 times of earth's mass and planet's surface radius is 0.2 times of earth radius. The ratio of escape velocity between the earth and the planet from their respective surface would be: 2 points
- 3.8:1
 2:1
 4:1
 1.6:1
- No, the answer is incorrect.**
Score: 0
Accepted Answers:
2:1