

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 - 19 Examination

Semester: 7**Subject Code: 03101431****Subject Name: Rocket and Missile Technology****Date: 15/05/2019****Time: 10:30am To 01:00pm****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (All are compulsory) (Each of one mark) (15)

1. Liquid propellants are also used in _____ rockets, where a rocket motor uses one solid and one gas or liquid propellants over two phases.
(a) Solid (b) Liquid (c) Cryogenic (d) Hybrid
2. Skin friction drag caused by the _____ of the atmosphere.
3. Missiles are generally classified on the basis of their Type, Launch Mode, Range, _____, Warhead and Guidance Systems.
(a) Atmosphere (b) Propulsion (c) Navigation (d) System launch
4. To overcome Earth's gravity for travel to a destination such as the Moon or Mars, the spacecraft must be accelerated to a velocity of approximately _____ Km per hour.
5. Examples of Ballistic missiles are _____
6. Cruise missiles can be categorized by _____, speed and range.
(a) Propulsion (b) Aerodynamic (c) Size (d) Nose head
7. Liquid propellants are _____ preferred over solid propellants due to their high density and efficiency levels.
8. Study of the movement of a body in the presence of air is called
(a) Dynamics (b) Fluid mechanics (c) Aerodynamics (d) None of the above
9. Ballistic missile that has a _____ trajectory over most of its flight path.
10. A _____ nose has very high drag, but it is excellent for structural integrity, aerodynamic heating resistance and amenability.
(a) Parabola (b) Blunt (c) Hemispherical (d) Ogive
11. Define Cruise Missile.
12. What is Rocket Dispersion?
13. Define Rocket Mass Ratio.
14. What is escape velocity of rocket?
15. Define Stable Configurations of Missiles/Rocket.

Q.2 Answer the following questions. (Attempt any three) (15)

- A) What are the differences between Rockets and Missiles?
- B) Explain about the Aerodynamics Drags of Rockets and Missiles.
- C) Explain the Rocket in Free Space.
- D) Explain advantages of multistaging of launch vehicles and ballistic missiles.

Q.3 A) With neat diagram explain Liquid propellant rocket. (07)

- B) Explain about the Slender body Aerodynamics of Rockets and Missiles. (08)**

OR

- B) Derive Center of Pressure equation of Rockets and Missiles. (08)**

Q.4 A) Derive Rocket Equation with Drag, Thrust and Gravity. (07)

OR

- A) Define and derive Terminal Velocity of Rocket. (07)**

- B) Define and explain Mass Ratio and Payload Ratio with diagram. (08)**