Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Aerospace Engg.) (2012 Batch) (Sem.–7,8)

SPACE MACHINES AND LAUNCH VEHICLES

Subject Code : ASPE-403

Paper ID : [72566]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION–A

1. Write briefly :

(a) Show inertial and Earth fixed coordinate reference frames.

(b) Explain Kepler's first and third laws of planetary motion.

(c) What do you understand by Geo-Synchronous orbits?

(d) On which parameter, life time of a satellite depends?

(e) Differentiate between solid and hybrid rocket engines.

(f) State the parameters on which burn-out velocity of a rocket depends.

(g) What are various types of launch vehicle trajectories?

(h) What are advantages of multi-stage rocket over single stage?

(i) State critical requirements for a manned mission.

(j) What are special features of materials for space craft.

SECTION–B

2. State and derive the results for Kepler's 2nd and 3rd Laws of motion.

3. With the help of neat sketches, explain single impulse and two impulse orbital transfer methods. Also describe their relative merits and de-merits.

4. Describe the methods of power generation in the spacecraft and features of life support system for manned space missions.

5. Derive equations of motion for one dimensional and two dimensional rocket motion in homogeneous gravitational field.

6. Explain the procedure for determination of satellite rectangular coordinates from orbital elements.

SECTION–C

7. With the help of neat diagrams, explain the construction and working of solid, liquid and hybrid rocket engines and compare their performances.

8. Define orbital speed. What are sources of orbital perturbations and explain special perturbation methods. Explain how various orbits are established?

9. Describe vertical, inclined and gravity turn trajectories and obtain the expression for burn out velocity for a rocket in a homogeneous gravitational field.