

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

M.Code : 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 : (2×10=20)

- (a) What do you mean by 'Inertial Coordinate Reference Frame'?
- (b) What do you understand by 'Sun-synchronous orbit'?
- (c) List at least four satellite launch vehicles.
- (d) What do you mean by 'homogenous gravitational field'?
- (e) List various factors affecting material for spacecraft.
- (f) What do you mean by 'Geostationary satellite'?
- (g) What do you mean by 'two impulse orbital transfer'?
- (h) What do you mean by 'burnout velocity'?
- (i) What do you mean by Euler transformations?
- (j) List various solid rocket propellants.

### SECTION-B

2. Distinguish between one-body and two-body problems. (5)
3. Distinguish between the solid propellant rocket and liquid propellant rocket. (5)
4. Explain the working principle of 'Liquid propellant rocket engine'. (5)
5. What are the special requirements of materials to perform under adverse conditions? (5)
6. Explain the life support system for manned space missions. (5)

### SECTION-C

7. What do you mean by orbital perturbations? Explain general and special perturbation methods. (10)
8. Explain the following :
  - a) Ballistic trajectory (3)
  - b) Ablative materials (3)
  - c) Staging of rockets (4)
9. Write notes on the following :
  - a) Cryogenic Rockets (5)
  - b) Hybrid Rockets (5)

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**