CBCS SCHEME

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18AS71

Seventh Semester B.E. Degree Examination, July/August 2022
Space Mechanics

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Discuss in detail the three potential problems created by vacuum environment over space craft. **(10 Marks)**

b. Give explanation about the effects of space environment on humans. **(10 Marks)**

OR

2 a. Discuss the effect of atmosphere on the life time of satellites. **(10 Marks)**

b. Explain the factors that affect the spacecraft structure in the space environment. **(10 Marks)**

Module-2

3 a. Explain the various reference frames and co-ordinate systems associated with space mechanics. **(10 Marks)**

b. Derive two-body problem, explain its significance. **(10 Marks)**

OR

4 a. Discuss and derive the differential equation for N-body problem. **(10 Marks)**

b. With necessary diagrams describe the Kepler's law of planetary motion. **(10 Marks)**

Module-3

5 a. Explain the general aspects of satellite injection and describe the orbital deviation due to injection errors. **(10 Marks)**

b. Explain different types of satellite orbital transfers in detail. **(10 Marks)**

OR

6 a. What are general and special perturbation methods? Briefly discuss Cowells method. **(10 Marks)**

b. What are the most important perturbing forces acting on artificial earth satellite? Explain briefly. **(10 Marks)**

Module-4

7 a. Discuss in detail about Heliocentric transfer with suitable example. **(10 Marks)**

b. Write short notes on sphere of influence and also calculate radius of Earth's sphere of influence of earth-sun system. **(10 Marks)**

OR

8 a. Explain Interplanetary Homann transfer in detail. Derive suitable equations. **(14 Marks)**

b. State Lamberts theorem, with diagram. **(06 Marks)**

Module-5

9 a. Write short notes on influence co-efficients of ICBM. **(10 Marks)**

b. Explain significance of Bhoost phase in detail with necessary sketch. **(10 Marks)**

OR

10 a. Derive the equation for time of flight for non-optimal trajectories. **(14 Marks)**

b. Explain the importance of impact points and its position with respect to Ballistic Missile Trajectory. **(06 Marks)**

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