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10AE763

Seventh Semester B.E. Degree Examination, May 2017
Space Mechanics and Launch Vehicles

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Define Inertial and earth fixed co-ordinate reference frames. **(06 Marks)**
b. Derive an expression for angular velocity vectors. **(06 Marks)**
c. Derive an expression for transformation of displacement. **(08 Marks)**

2 a. Derive the general solution of Two body problem and find the force equation. **(08 Marks)**
b. State and derive the Kepler's equation for planetary motion. **(12 Marks)**

3 a. Derive an equation for long range ballistic Trajectories. **(10 Marks)**
b. Derive an expression for perturbation of orbital parametry. **(10 Marks)**

4 a. Explain with neat sketches, Geosynchronous and Geostationary Satellites (orbit). **(08 Marks)**
b. Describe and explain the Hohmann Transfer orbits with equation. **(12 Marks)**

PART – B

5 Write short notes on :
a. Solid rocket engine.
b. Liquid rocket engine.
c. Cryogenic rocket engine.
d. Hybrid rocket engine. **(20 Marks)**

6 a. List the type of Rocket engines on four different basis. **(12 Marks)**
b. Describe briefly Vertical and Horizontal Trajectories. **(08 Marks)**

7 a. Discuss the principles of optimizing a multistage rocket. **(10 Marks)**
b. Derive the expressions on the performance of single stage rocket engines. **(10 Marks)**

8 a. What are the selections of materials for space craft? Explain. **(10 Marks)**
b. Write short notes on :
i) Manned space craft's ii) Un-manned space craft's. **(10 Marks)**

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