R09

Code No: D7602

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II - Semester Examinations, March/April 2011
SPACE TRANSPORTATION SYSTEMS
(AERO SPACE ENGINEERING)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1. Answer the following:
   a) Give a brief description of each of the phases of the system engineering process that are conducted in all NASA projects.
   b) Define system integration. List and briefly elaborate all the trade studies including those for Vehicle and Operations that are involved in the system integration process. [12]

2. Answer the following:
   a) List the four logical steps that have to be followed when planning for future space infrastructure. Mention the twelve basic building blocks for lunar and Mars exploration and exploitation. Write about:
      i) Hypothesized infrastructure.
      ii) Integrated Space plan.
      iii) Terrestrial independence.
   b) Write about the development of the main propulsion system located on the shuttle orbiter in the space shuttle transportation system. [12]

3. Answer the following:
   a) Give a brief history of development of the Scout family of launch vehicles by mentioning the various vehicle versions.
   b) Write about Hypersonic waveriders. Mention the criticisms faced by the waverider concepts. [12]

4. Define launch operations. Elaborate on at least six of the major facility requirements for launch operations to be performed. [12]

5. List the steps involved in the conceptual design process of a launch vehicle. Discuss the five optimization strategies that can be applied to the design process. [12]

6. Describe each of the levels in the process of technology prioritization. Write about:
   a) TIPS software tool.
   b) Advantages of technology prioritization process and the TIPS tool. [12]

7. What is configuration management? Why do we need configuration management? Write about the five major functions involved in this management process. [12]

8. Answer the following:
   a) Write about three solar propulsion concepts and their advantages and disadvantages.
   b) Write about three laser beam propulsion concepts. Draw a neat sketch of the laser light sail concept. Mention about beamed microwave thrusters. [12]

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