

Code No: 07A62106

**R07**

**Set No. 2**

**III B.Tech II Semester Regular/Supplementary Examinations, May 2010  
INTRODUCTION TO SPACE TECHNOLOGY**

**Aeronautical Engineering**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

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1. With the help of neat sketches, discuss multi-staging of rockets by stacking 'one after the other' ('tandem staging') and 'parallel staging'. Bring out the major advantages and/or disadvantages of adopting tandem staging, parallel staging and a combination. [16]
2. A spacecraft is in a circular parking orbit at an altitude of 200 km from the earth. Calculate the velocity change required to perform a Hohmann transfer to a circular orbit at geosynchronous altitude, in the same plane. [16]
3. (a) How many sets of initial conditions can we make use of for solving the two-body equation of motion? Give an example of one set of these.  
(b) A remote sensing satellite is in a circular orbit of 7,500 km. What is its inclination? [8+8]
4. Is power generation possible continuously in a satellite? Consider  
(i) a polar sun-synchronous satellite and  
(ii) geostationary satellite  
and discuss. [16]
5. (a) What are the effects of charged particles on a satellite?  
(b) List out the precautions that the astronaut should follow to avoid or minimize the damage due to radiation. [6+10]
6. (a) Explain how the thrust of a rocket develops. Derive the equation for the thrust. Differentiate between under-expanded and over-expanded nozzle performance.  
(b) Compare the various type of supersonic nozzles. [10+6]
7. Explain briefly about the attitude control for Nonspinning space craft. [16]
8. Describe the two requirements (a high value and a low value) for the hypersonic drag coefficient of a re-entry space vehicle. [16]

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