

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY**IV B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS
SPACE MECHANICS
(AERONAUTICAL ENGINEERING)**

JULY- 2005

TIME: 3 HOURS

MAX MARKS: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain in detail regarding
 - i. co-ordinate systems in space and
 - ii. Classification of planets.(b) Explain how celestial sphere concept is used in studying motion of an object in the sky.
2. (a) List out various elements and bring out the significance of parabolic and hyperbolic orbits.
(b) Discuss about the following:
 - i. The many body problem
 - ii. Circular restricted 3-body problem
3. Present a detailed report on various types of earth orbits in spacecraft analysis.
4. Write a note on
 - (a) solar radiation perturbation,
 - (b) earth triaxiality perturbation and
 - (c) Luni-solar perturbation.
5. (a) Write a detailed note on six classical orbital elements which are necessary to specify a particular orbit on the basis of a two-body problem.
(b) Describe in detail Cowell's and Encke's methods as applicable to orbital perturbations?
6. Write in detail about different perturbations, which affect spacecraft trajectory.
7. Desired range 10120 km ($\tilde{A}= 90:900$) to a target takes a long way round to the target $\tilde{A}= 269:080$:
 - (a) Find $\tilde{A}60$; and
 - (b) compare the long and short trajectory characteristics.
8. (a) Discuss about solar electron and solar proton events.
(b) Write about meteoroids and micrometeoroids.