TEZPUR UNIVERSITY
Assignment(Spring)2020

MMS301: Classical Mechanics

Total Marks: 30

The figures in the right-hand margin indicate marks for the individual question.
All questions are compulsory.
Answers should be concise and entire answer to a question should be together. State assumptions wherever made.

1. A particle of mass m which was at rest at a height h starts falling vertically downward through the atmosphere at time $t = 0$. If the viscous force offered by the atmosphere is proportional to the instantaneous velocity of the particle, then
   (a) write down Newton's equation of motion and solve it to find the position of the particle as a function of time. [6]
   (b) Deduce the expression of the critical velocity of the particle. [3]
   (c) Find the time required for the particle to fall through half the initial height of the particle. [3]
2. State and explain Keplar's laws of motion. Deduce polar form of the equation of planetary orbits. $[2 + 4 = 6]$
3. What are Canonical Transformations? Describe the four types of Generating Functions of Canonical Transformations. $[2 + 4 = 6]$
4. Define and deduce the properties of Poisson's Brackets. Derive the equation of motion in term of Poisson's Brackets. $[3 + 3 = 6]$

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