

Physics 5300, Theoretical Mechanics Spring 2015

Quiz 7

Given: Friday Feb 27

Problem 1 Consider the Atwood machine, with the pulley being a uniform disc with a mass M and a radius R . The two masses connected by a massless string are m_1 and m_2 . Use the vertical position y of the mass m_1 as a generalised coordinate. [Note that the moment of inertia of a uniform disc about its central axis is $\frac{1}{2}MR^2$.]

- (a) Write the Lagrangian. (3 points)
- (b) Find the generalized momentum p . (2 points)
- (c) Find the Hamiltonian. (2 points)
- (d) Solve Hamilton's equations to get $\ddot{y}$. (3 points)