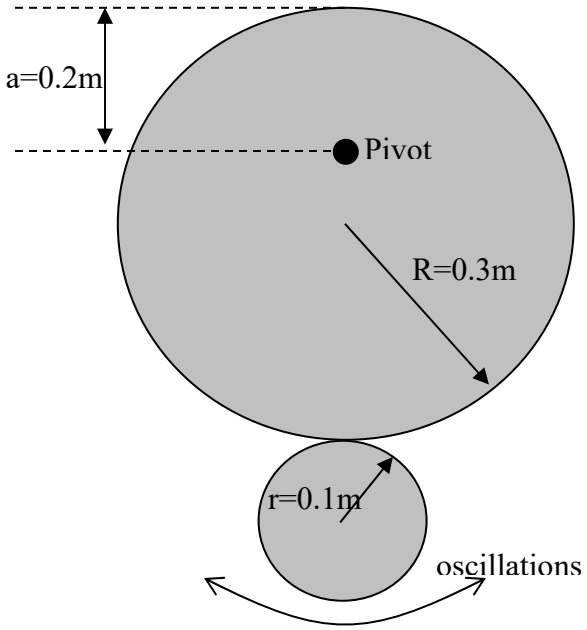
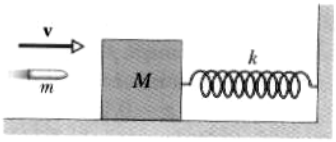
Physics 211 Problem Set 13 Due Fri, 12/06/19
Last Name:_____ First Name _____
Workshop time or section:_____TA name or Room # _____

1. A pendulum consists of two uniform disks of the same thickness and density but different radii as shown below. Location of the pivot point and dimensions are given below. What is the period of the pendulum? (Assume g=10 m/s^2)
   Hints*: Area of a circle is given by* πR^2.



2.A block of mass *M*, at rest on a horizontal frictionless table, is attached to a rigid support by a spring of constant *k*. A bullet of mass *m* and velocity v strikes the block as shown below. The bullet remains embedded in the block.



(a) Determine the velocity of the block immediately after the collision (in terms of M, m and v).
Hints: *What kind of collision is it? Is mechanical energy conserved? Is momentum conserved?*

(b) Determine amplitude of the resulting simple harmonic motion (in terms of M, m, v and k).
Hints: *In which form is the energy right after the collision? Is mechanical energy conserved in simple harmonic oscillations? How amplitude is related to the energy?*