PHYS 101

Homework # 8
DUE DATE: November 13, 2009

Please do not submit copycat answers from the solutions book or some other solution you have in hand. You should at least show your understanding of the problem. Otherwise, this will be considered as cheating.

1) Discussion Question Q8.6 in the text. Chapter 8.

2) **Bullet passing through a wooden block on the floor.**

A bullet is fired horizontally, with a speed v_0 ,into an initially stationary wooden block lying on the horizontal floor. The mass M of the block is much larger than the mass m of the bullet. After the bullet passes through the block, the wooden block moves a distance L along the floor before coming to rest. The coefficient of friction between the block and the floor is μ.
a) What is the speed of the block just after the bullet has passed through it?
b) What is the speed of the bullet just after it has passed through the block?

3) **Center of a mass of a disk with a hole .**
The figure shows a disk of radius R. A hole, of diameter R/2 has been drilled along a diameter of this disk so as to centered halfway between the center of this disk and its periphery. Where, relative to the center of the disk is the center of mass of the disk with its hole?
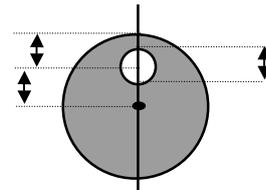
4) **Thermal energy produced in a collision.**
Two cars, having masses m and 3m, move toward each other along the horizontal floor. Before they collide, each car has the same speed v relative to the floor. After their collision, the cars stick together. Air resistance and friction forces by the floor are negligible.. By what amount does the thermal energy of the system (consisting of the carts and the floor) increase as a result of the collision between the cars? Express your answer in terms of m, and v.

5) Problem 8-92   in the text. Chapter 8.