

# Physics 160 Written Homework - Chapter 10-11

## 1 Torque

Two blocks hang from either end of a massless rope that runs over a pulley, treated as a thin solid disk, (An Atwood's Machine), and are held in place. One block has a mass of  $12kg$ , the pulley has a mass of  $4kg$  and radius  $10cm$ , and the other block's mass is unknown. The blocks are released from rest, and the block of known mass accelerates toward the ground at a rate of  $1m/s^2$ . The rope does not slip over the pulley, and the pulley spins on a frictionless axle. Find the unknown mass of the block.

## 2 Angular Momentum

A thin disk of uniform density, mass  $5kg$  and radius  $.25m$ , rests on a frictionless table. A small lump of clay, which can be treated as a point particle of mass  $1kg$ , travels toward the disk at a velocity of  $6m/s$ , and impacts it tangentially at the very edge of the disk, where it sticks. Find the linear and angular speed of the disk clay system after the impact.