

PRELAB 7: FINDING THE MOMENT OF INERTIA

COMPLETE THIS EXERCISE BEFORE COMING TO LABORATORY AND TURN IN AT THE BEGINNING OF LAB 7

- 1) [10 points] In the apparatus for this experiment, the hanging mass below is allowed to fall. As it does, the string wrapped around the hub of the hoop causes the hoop to rotate.
 - a) Draw a free body diagram of the hanging mass (see figure below) showing the forces acting on it. Describe each force in words (“_____ is the force of _____ acting upon _____”).
 - b) Assume the linear acceleration of the mass to be a and write Newton's 2nd law. You will get an expression relating the tension, T , to the acceleration a , and the hanging mass m .
 - c) Assume the angular acceleration of the hoop and hub to be α and write Newton's 2nd law. You will get an expression relating the tension, T , to the angular acceleration α , the radius of the hub r , and the moment of inertia I .

