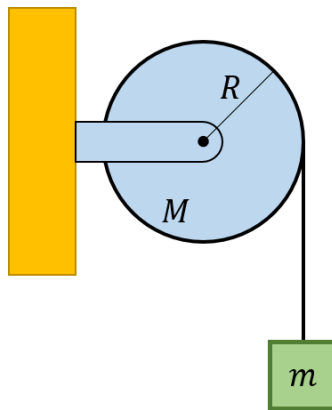


ENGR/PHYS 216 – Spring 2023
HW Assignment 10: Angular Momentum

- Calculate the angular momentum and kinetic energy of an object rotating at 2.60 rad/s with a mass of 7.50 kg and a radius of 0.501 m given the following geometries:
 - Solid cylinder
 - Hollow cylinder
 - Solid sphere
 - Hollow sphere
- A 26 g block hangs from a 350 g rotating solid disk, as shown below. If the radius of the disk is 12 cm , what is the speed of the block after it has dropped 55 cm starting from rest? If a disk with radius 5.0 cm is used instead, how does your answer change?



- The [Singapore Flyer](#) is a giant observation wheel (similar to a Ferris wheel) that has 28 capsules and can hold a total of 784 passengers. The diameter of the wheel is 150 m and the entire thing rotates one complete revolution in 30 minutes . The rim weighs $7 \times 10^5 \text{ kg}$, the capsules each weigh $1 \times 10^4 \text{ kg}$, and the average person weighs 70 kg . Calculate (a) the magnitude of the angular momentum at full capacity, and (b) the average net external torque applied to the spindle (axle) if it comes to a complete stop in 15 minutes . Write your answers using 3 significant digits.
- An odd-shaped object rotates at a speed of 12 rev/s . A small 25 g mass with moment of inertia $I = 2.5 \times 10^{-6} \text{ kg} \cdot \text{m}^2$ is dropped onto the object at a distance of 3.2 cm from its center of mass. The odd-shaped object slows to a speed of 7.5 rev/s . What is the moment of inertia of the odd-shaped object?
- A playground has a small merry-go-round with radius 1.00 m . It's moment of inertia is 135 kgm^2 . A small child with mass 21.5 kg runs at a velocity of 2.75 m/s along a path tangent to the outer rim of the stationary merry-go-round and jumps on. Calculate (a) the magnitude of the angular momentum of the child about the axis of rotation of the merry-go-round, and (b) the angular speed of the combined merry-go-round plus child after the child jumped on. You may assume the child is a point mass.