

Rotational Conservation of Energy

1. A wheel, with a mass of 7 kg and a radius of .85 m, is rolling along flat ground with an angular speed of 89 rad/s. How much energy does the wheel have? Treat the wheel as a solid disk.
2. A solid sphere, starting from rest, rolls down a ramp that is 1.3 m tall at the top. The sphere has a mass of .32 kg and a radius of .20 m. How fast (v_T) is the sphere moving at the bottom of the ramp?
3. A rod, with a mass of .4 kg and a length of .75 m and one end stationary on ground, starts from rest at angle of 40° and falls. What is speed (v_T) of end of stick when the stick hits the ground?
4. A solid sphere, a solid cylinder, and a thin hoop each are roll down a ramp that is .80 m tall. If each one starts from rest, which one will reach the bottom first? HINT: The first one to the bottom will be the one with the higher v.
5. You've climbed up to the top of a 7.5 m high telephone pole. Just as you reach the top, the pole breaks at the base. Are you better off letting go of the pole and falling straight down, or sitting on top of the pole and falling down to the ground on a circular path? Or does it make a difference?