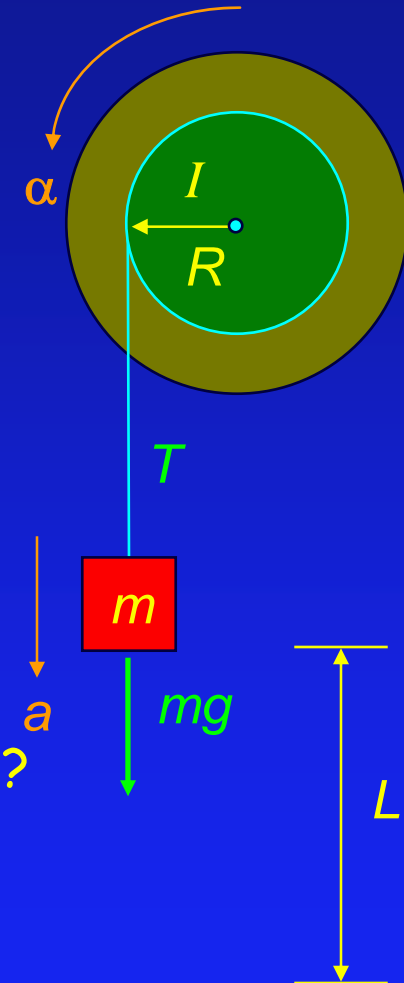# Falling weight & pulley

- A mass *m* is hung by a string that is wrapped around a pulley of radius *R* attached to a heavy flywheel. The moment of inertia of the pulley + flywheel is *I*. The string does not slip on the pulley.
  Starting at rest, how long does it take for the mass to fall a distance *L*.

α

I

R

T

m

a mg

L

What method should we use to solve this problem?

A) Conservation of Energy (including rotational)

B) $\Sigma\tau = I\alpha$ and then use kinematics

Either would work, but since it asks for time, we will use B.