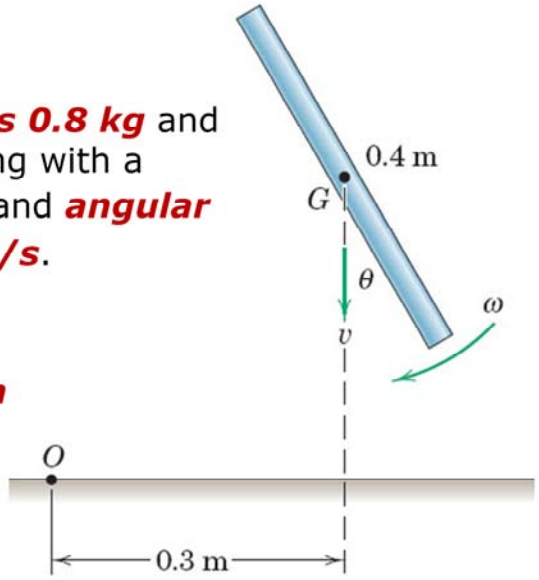
Question of the Day

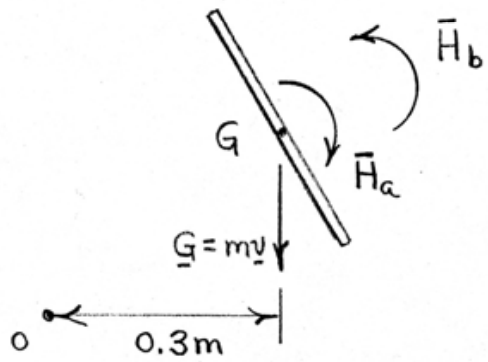
$$H_O = I_G\omega + mvd$$

A slender bar of ***mass 0.8 kg*** and ***length 0.4 m*** is falling with a ***velocity v = 2 m/s*** and ***angular velocity ω = 10 rad/s***.

Determine the ***angular momentum H_O*** of the bar about ***point O***.



6/174



$\bar{H} = \bar{I}\omega = \frac{1}{12} m l^2 \omega = \frac{1}{12} 0.8(0.4)^2 10$

$= 0.1067 \ \text{kg}\cdot\text{m}^2/\text{s}$

$G = mv = 0.8(2) = 1.6 \ \text{kg}\cdot\text{m/s}$

(a) $H_o = \bar{H}_a + Gr = 0.1067 + 1.6(0.3)$

$= \underline{0.587 \ \text{kg}\cdot\text{m}^2/\text{s}}$

(b) $H_o = -\bar{H}_b + Gr = -0.1067 + 1.6(0.3)$

$= \underline{0.373 \ \text{kg}\cdot\text{m}^2/\text{s}}$