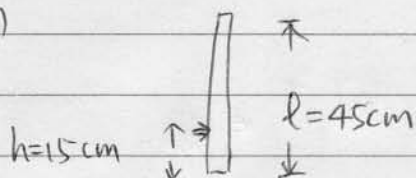


Homework #11

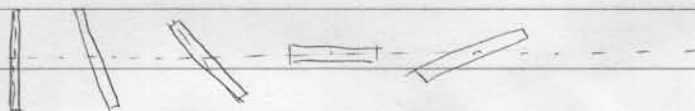
1. (a)



$$M = 440 \text{ g}$$

$$m = 7.8 \text{ g}$$

Because $m \ll M$, so the center of mass of the combined system is at $\frac{l}{2}$



(b). Momentum conservation

$$mv = (M+m)v'$$

$$v' = \frac{m}{M+m} v = 12.7 \text{ m/s}$$

(c) Angular momentum conservation.

$$I\omega = mv\left(\frac{l}{2} - h\right)$$

$$\omega = \frac{mv\left(\frac{l}{2} - h\right)}{I}$$

$$I = \frac{Ml^2}{12} + m\left(\frac{l}{2} - h\right)^2$$

$$\omega = \cancel{57} 57 \text{ s}^{-1}$$