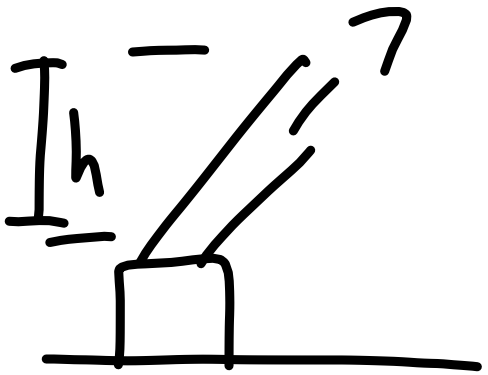
① $m_A = 40.0\ kg$

$m_B = 60.0\ kg$



$E_i = E_f$

Not enough info.

$PE_s = K_f + U_f$

$\frac{1}{2}kx^2 = \frac{1}{2}mv_f^2$

$$\frac{1}{2}kx^2 = \frac{1}{2}m_A v^2$$

$$\sqrt{\frac{kx^2}{m}} = v_{FA}$$

$m_A = 40.0\,kg$

$m_B = 60.0\,kg$

$m_B = \frac{3}{2}m_A$

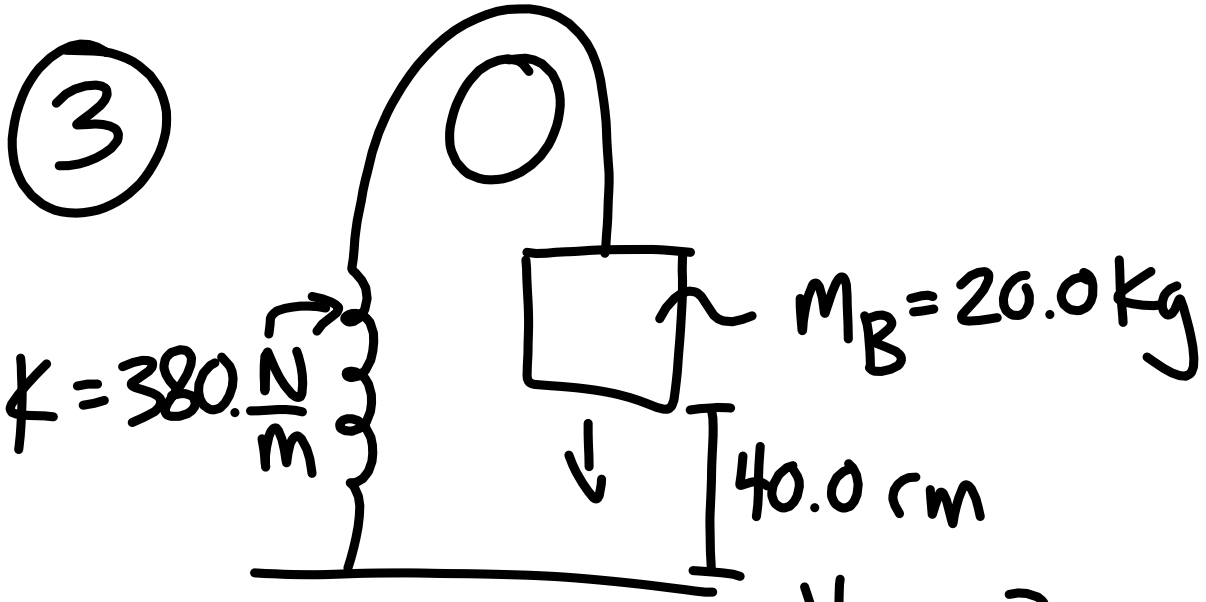
$$\frac{1}{2}kx^2 = \frac{1}{2}\left(\frac{3}{2}m_A\right)v^2$$

$$kx^2 = \frac{3}{2}m_A v^2$$

$$\sqrt{\frac{\frac{2}{3}kx^2}{m_A}} = v_{F_B} \qquad \sqrt{\frac{kx^2}{m_A}} = v_{F_A}$$

$$\sqrt{\frac{2}{3}} = v_{f_B} \qquad 1 = v_{f_A}$$

3



$$E_i = E_f$$

$$U_i = PE_s + K_f$$

$$mgh = \frac{1}{2}kx^2 + \frac{1}{2}mv^2$$

$$mgh = \frac{1}{2}kx^2 + \frac{1}{2}mv^2$$

$$mgh - \frac{1}{2}kx^2 = \frac{1}{2}mv^2$$

$$2mgh - kx^2 = mv^2$$

$$\sqrt{\frac{2mgh - kx^2}{m}} = v \rightsquigarrow \sqrt{\frac{2mgh}{m}} - \sqrt{\frac{kx^2}{m}}$$

$$2.19\ \frac{m}{s} = v_f$$

$F = ma$

$kg \cdot \frac{m}{s^2}$