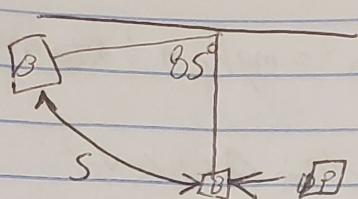


$$m_B = 0.224 \text{ kg}$$

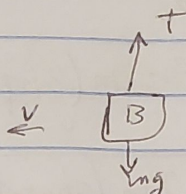
$$m_P = 0.041 \text{ kg}$$

$$\theta = 85^\circ$$

$$L = 2.82 \text{ m}$$



$$S = 4.18 \text{ m}$$



find how much energy is required to move the box

find velocity of the projectile

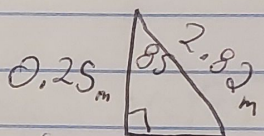
$$\sum F_y = T - mg = \frac{mv^2}{r}$$

$$mgh_B + \frac{1}{2}mv_B^2 = mgh_C + \frac{1}{2}mv_C^2$$

$$\frac{1}{2}mv_B^2 = mgh_C$$

$$\frac{1}{2}v_B^2 = gh_C$$

$$v = \sqrt{2gh_C}$$



$$h_C = 2.82 - 0.25$$

$$v = \sqrt{2(9.8)(2.57)} = 7.1 \text{ m/s}$$

$$m_1 v_{1i} + m_2 v_{2i} = m_c v_f$$

$$m_c = 0.265 \text{ kg}$$

$$m_1 v_{1i} = m_c v_f \quad v_{1i} = \frac{m_c v_f}{m_1}$$

$$\frac{(0.265)(7.1)}{0.041} = \frac{45.89 \text{ m/s}}{49.35 \text{ m/s}}$$

2. 49.35 m/s