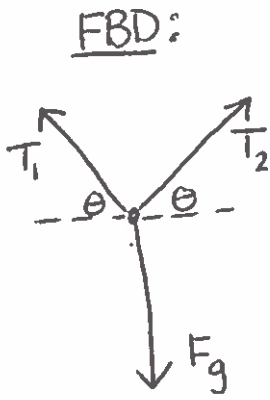


①



$$\theta = 35^\circ$$

$$m = 5.0 \text{ kg}$$

$$\sum F_x = T_2 \cos \theta - T_1 \cos \theta = 0$$

$$\therefore T_1 = T_2 = T$$

$$\sum F_y = T_1 \sin \theta + T_2 \sin \theta - F_g = 0$$

$$\therefore T_1 \sin \theta + T_2 \sin \theta = F_g$$

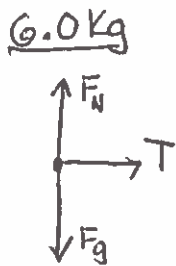
$$2T \sin \theta = mg$$

$$\therefore T = \frac{mg}{2 \sin \theta} = \frac{(5.0)(9.8)}{2 \sin(35^\circ)}$$

$$T = 42.7144$$

$$T = 43 \text{ N}$$

②

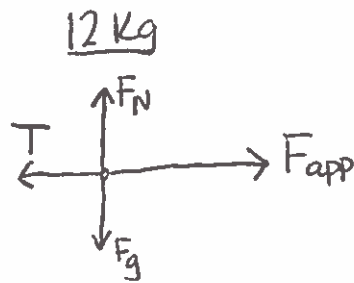


$$\sum F_x = T$$

$$m_1 a = T$$

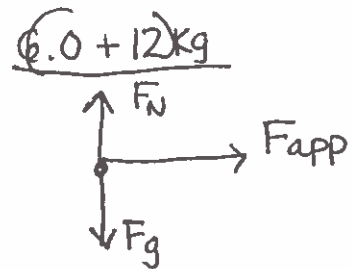
$$(6.0)(1.3889) = T$$

$$T = 8.3 \text{ N}$$



$$\sum F_x = F_{app} - T$$

$$m_2 a = F_{app} - T$$



$$\sum F_x = F_{app}$$

$$(m_1 + m_2) a = F_{app}$$

$$(6.0 + 12) a = 25 \text{ N}$$

$$\frac{18}{1} a = \frac{25}{18}$$

③

$$a = 1.3889 \text{ ms}^{-2}$$

$$a = 1.4 \text{ ms}^{-2}$$

$$\textcircled{4} \quad m_1 u_1 + m_2 u_2 = (m_1 + m_2) v$$

$$(45.0)(0) + (5.0) u_2 = (45.0 + 5.0)(0.50 \text{ (ms}^{-1}\text{)})$$

$$5.0 u_2 = 25$$

$$u_2 = 5.0 \text{ ms}^{-1}$$

$$\textcircled{5} \quad \Delta p = m \Delta v$$

$$0.80 = m(4.0)$$

$$\therefore m = 0.20 \text{ kg}$$

$$\textcircled{6} \quad \text{Work Done}$$

$$W = F_s$$

$$W = \Delta KE = \frac{1}{2} m (v^2 - u^2)$$

$$\therefore v = \sqrt{\frac{2W}{m} + u^2}$$

$$v = \sqrt{\frac{2(4.00 \times 10^5)}{1110} + (10.0)^2}$$

$$v = 28.6482$$

$$v = 28.6 \text{ ms}^{-1}$$

$$\textcircled{7} P = \frac{W}{t} = \frac{Fs}{t}$$

$$\therefore F = \frac{Pt}{s}$$

$$F = \frac{(65000)(35)}{(17.5)}$$

$$F = 130,000 \text{ N}$$

or

$$1.3 \times 10^5 \text{ N}$$