#1

$$V^2 = V_0^2 + 2a(x - x_0)$$

$$13^2 = 0 + 2a(2.8)$$

$$5.6a = 169$$

$$a = 30.179$$

$$F = (7)(30.179)$$

$$= 211.25\text{N}$$

#2

$a \downarrow$ $a = ?$ Apparant mass, $m_a = 58\,kg$

$$F_T = m_a g$$

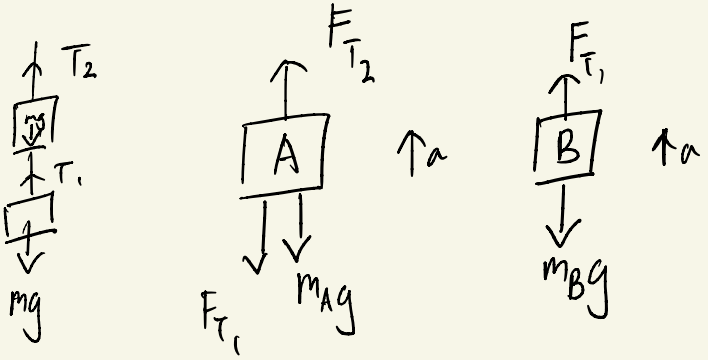
$$mg - F_T = ma$$

$$a = \frac{mg - F_T}{m} = \frac{(75 \times 9.8) - (58 \times 9.8)}{75}$$

m $\quad$ m_a $\quad$ m

#3

a)



T_1: $3.2 \times 9.81 = 31.392 \approx 31N$

T_2: $2 \times T_1 = 62.784 \approx 63N$

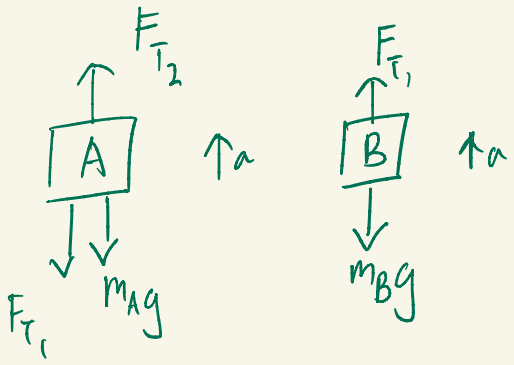
b)

$F = ma$

T_1: $3.2 \times (9.8 + 1.25) = 35.36\ N$

T_2: $2 \times T_1 = 35.36 \times 2$

$= 70.72N$



For body A: $F_{T_2} - F_{T_1} - m_A g = m_A a = 0$

$$\Rightarrow F_{T_2} = F_{T_1} + m_A g \quad - (1)$$

For body B: $F_{T_1} - m_B g = m_B a = 0$

$$\Rightarrow F_{T_1} = m_B g \quad - (2)$$

(2) in (1) $\quad F_{T_2} = 2mg$

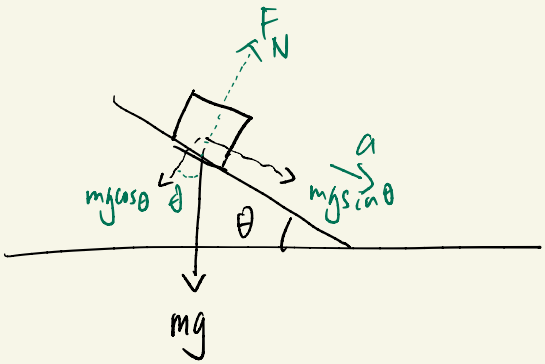
$= 63N$

b) $a = 1.25 m/s^2$ (upwards) $\quad F_{T_1} = ? \quad F_{T_2} = ?$

$F_{T_1} - m_B g = m_B a \Rightarrow F_{T_1} = 35N$

$F_{T_2} = 71N$

4



a)

$$mg\sin\theta = ma$$

$$(7)(9.8)\sin 22^\circ = (7)a$$

$$a = 3.67\ m/s^2$$

b)

$$v^2 = v_0^2 + 2a(x - x_0)$$

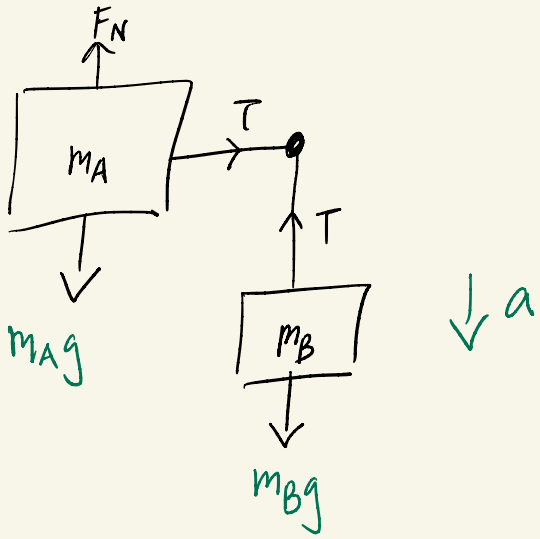
$$v = \sqrt{0 + 2(3.67)(12)}$$

$$= 9.385$$

$$\approx 9.3\ m/s$$

#5

a)



For B : $m_B g - F_T = m_B a$

For A : $F_T = m_A a$

a ?

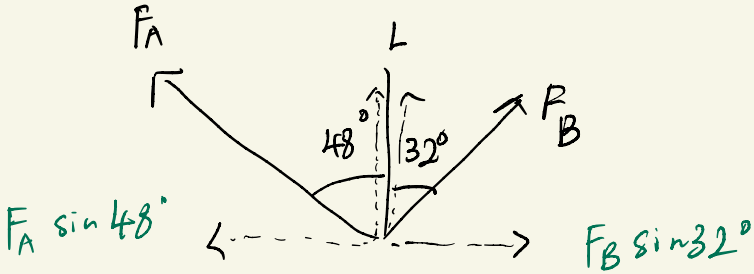
$$m_B g - m_A a = m_B a$$

$$m_B g = m_B a + m_A a$$

$$a = \frac{m_B g}{m_B + m_A} = g\left(\frac{m_B}{m_A + m_B}\right)$$

$$F_T = g\frac{m_A m_B}{m_A + m_B}$$

#6



x component :

$$F_B \sin 32° - F_A \sin 48° = 0$$

$$F_B = \frac{F_A \sin 48°}{\sin 32°}$$

$$= 631 \text{ N}$$

y - component :

$$F_A \cos 48° + F_B \cos 32°$$

$$= 836 \text{ N}$$

#7

$$f_s = \mu_s F_N$$

$$f_s = \mu_s N$$

$$= (0.3)(22 \times 9.8)$$

$$= 64.68$$

$$\approx 65 N$$

#8

a) $$mg\sin\theta - \mu_k N = ma$$

$$mg\sin\theta - \mu_k mg\cos\theta = ma$$

$$a = g\sin\theta - \mu_k g\cos\theta$$

$$= 2.454 \, m/s^2$$

b) $v^2 = v_0^2 + 2a(x - x_0)$

$$v = \sqrt{0 + 2(2.484)(8.15)}$$

$$= 6.3 \text{ m/s}$$