From HW (PP 478)

18.

$m = 485\,kg + 15(75\,kg)$

$m = 1610\,kg$

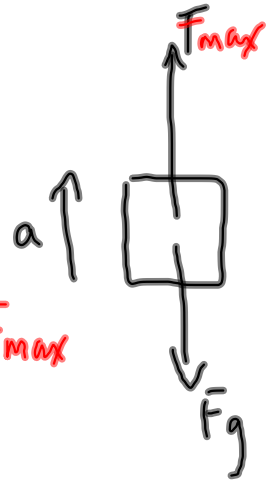
$F_g = mg$

$F_g = (1610\,kg)(9.8\,m/s^2)$

$F_g = 15794.1\,N$

$T = 3.74 \times 10^4\,N$ / 2 = F_{max}

$a = ??$



$\vec{F}_{net} = m\vec{a}$

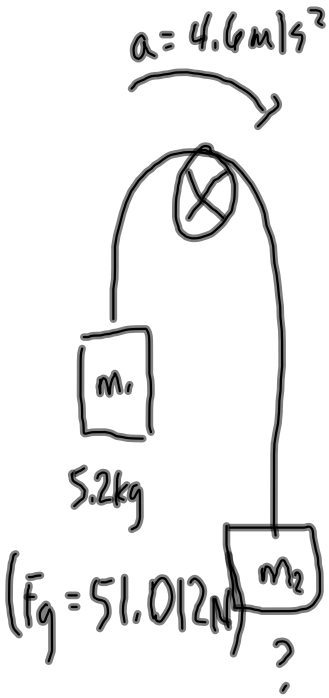
$F_{max} - F_g = ma$

$(3.74 \times 10^4\,N / 2) - 15794.1\,N = (1610\,kg)a$

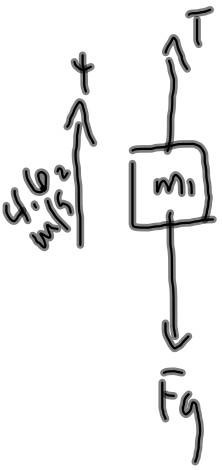
$18700\,N - 15794.1 = 2905.9 = (1610\,kg)a$

$a = 1.8\,m/s^2$

20.



Consider m_1:



$\vec{F}_{net} = m\vec{a}$

$T - F_g = ma$

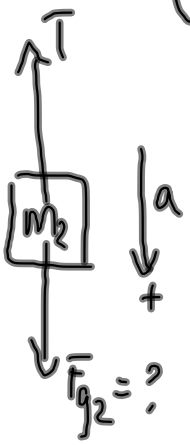
$T - 51.012N = (5.2kg)(4.6\ m/s^2)$

$T - 51.012N = 23.92N$ (F_{net})

$T = 74.932N$

$\boxed{T = 75N}$

Consider m_2:



$\vec{F}_{net} = m\vec{a}$

$F_{g_2} - T = m_2 a$

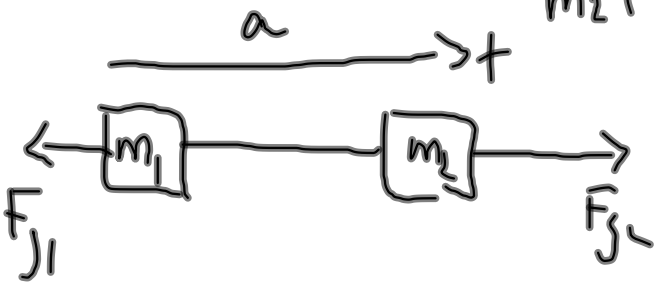
$m_2 g - T = m_2 a$

$m_2 g - m_2 a = T$

$m_2 (g - a) = T$

$m_2 (9.81 m/s^2 - 4.6 m/s^2) = 74.932N$

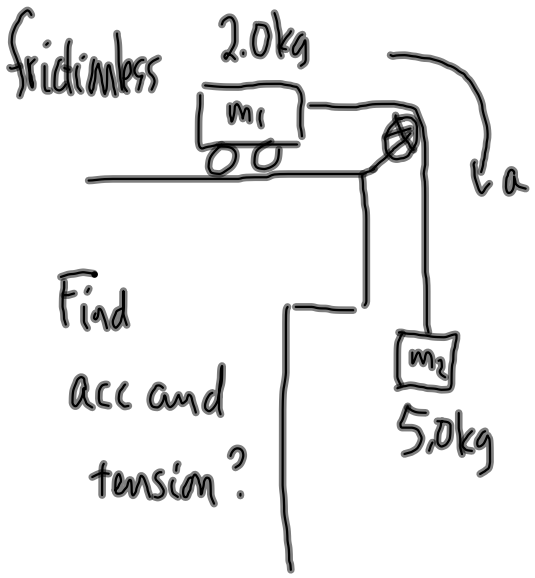
$m_2 (5.21 m/s^2) = 74.932N$



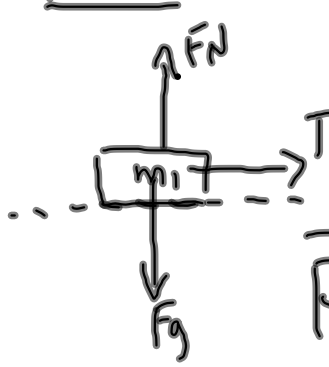
$m_2 = \frac{74.932N}{5.21 m/s^2}$

$m_2 = 14kg$

Example (Fletcher's Trolley)



Mass 1

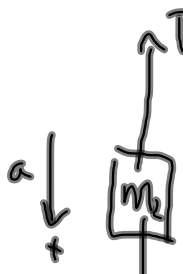


$\vec{F}_{net} = m\vec{a}$

$T = ma$

$T = (2.0kg)\,a$

Mass 2



$\vec{F}_{net} = m\vec{a}$

$F_{g_2} - T = m_2 a$

$49.05N - T = (5.0kg)\,a$

$F_{g_2} = 49.05N$

Solve the System:

$49.05N - (2.0kg)a = (5.0kg)\,a$

F_{g_2}

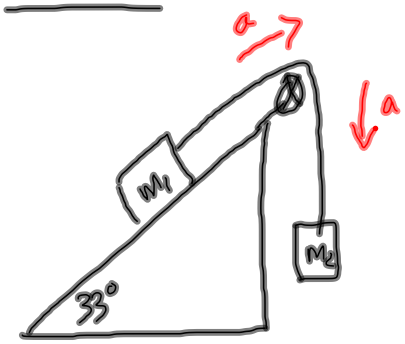
total mass

$49.05N = (7.0kg)\,a$

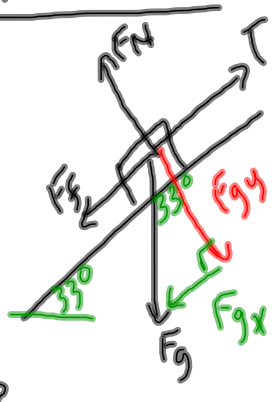
$a = 7.0 m/s^2$ → $T = (2.0kg)(7.0\ m/s^2)$

$T = 14N$

MP|486



Consider Mass 1



$m_1 = 615g$ / $F_{g_1} = 6.03315N$

$m_2 = 525g$ / $F_{g_2} = 5.15025N$

$\mu_k = 0.19$

$a = ?$ / $T = ?$

$\vec{F}_{net} = m\vec{a}$

$T - (F_f + F_{g_x}) = m_1 a$

$T - (\mu F_N + F_g \sin\theta) = m_1 a$

$T - (\mu F_g \cos\theta + F_g \sin\theta) = m_1 a$

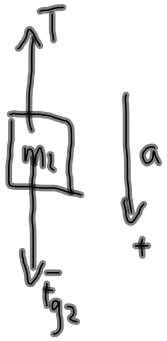
$T - ((0.19)(6.03315N)(\cos 33^\circ) + (6.03315N)(\sin 33^\circ)) = (0.615kg)a$

$T - (0.96137N + 3.2858N) = (0.615kg)a$

$T - 4.247N = (0.615kg)a$

has to be smaller than F_{g_2} to go uphill

Consider m_2



$\vec{F}_{net} = m\vec{a}$

$F_{g_2} - T = m_2 a$

$5.1502N - T = (0.525kg)a$

$a = 0.79 m/s^2$

$T = 4.7N$

TO DO: (for WED) PP|488-489 (not 26)