Connected Masses

December-10-15 8:38 AM

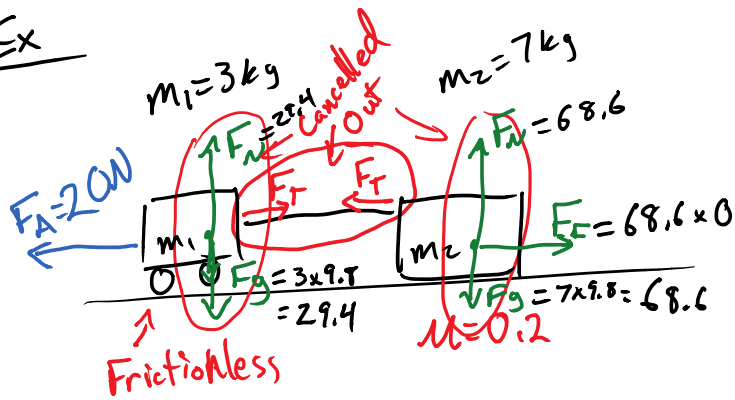
① Have a clear diagram (with labels)

② Rely on $F_{Net} = \sum$ Forces

$F_{net} = m \cdot a$

③ Separate and switch between thinking about individual masses and the system as a whole.

Ex



What is the acceleration of the blocks?

↓ System (Both Blocks)

$F_{Net_{system}} = F_A + F_F$

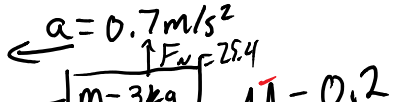
$m_{sys} \cdot a$

$(m_1 + m_2)\, a = 20 - 13.72$

$3 + 7$

$\frac{10 \cdot a}{10} = \frac{6.28}{10}$

$a = 0.628\ m/s^2$



What is the mass of the hanging block?

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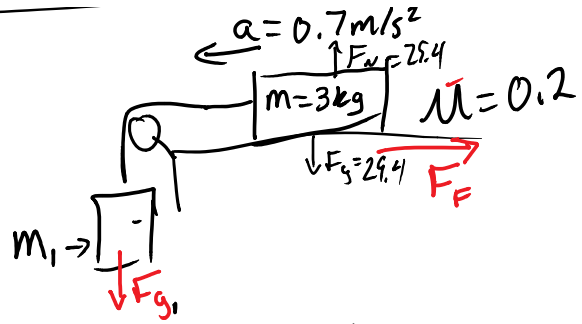


Consider as a system.

$F_{net\ system}$ = Total mass × acceleration = $\sum$ Forces

$m_1 g + \mu F_{N_2}$

$$(m_1 + 3) \times 0.7 = m_1 \times 9.8 - 0.2 \times 29.4$$

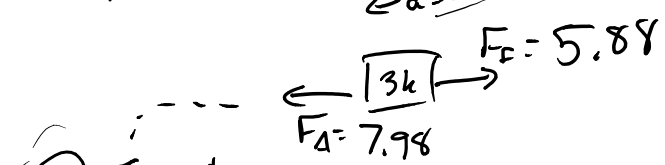
$$0.7m_1 + 2.1 = 9.8m_1 - 5.88$$

$-9.8m_1$ -2.1 $-9.8m_1$ -2.1

$$-9.1m_1 = -7.98 \Rightarrow m_1 = 0.88kg$$

-9.1 -9.1

Separate Pieces



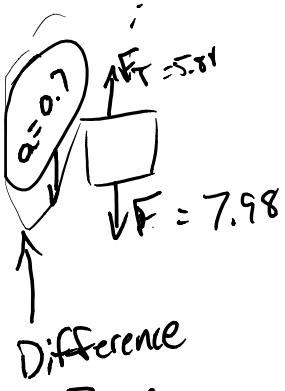
$ma = F_A - F_E$

$3 \times 0.7 = F_A - 5.88$

$2.1 = F_A - 5.88$

$+5.88$ $+5.88$

$7.98 = F_A$



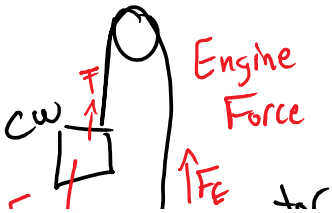
Difference From Gravity

$$7.98 = m(9.8 - 0.7)$$

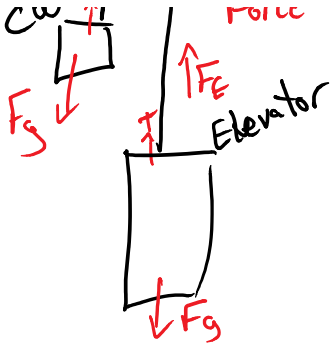
$$m = 0.88kg$$

Elevator = 1012kg + Person 75kg = 1087

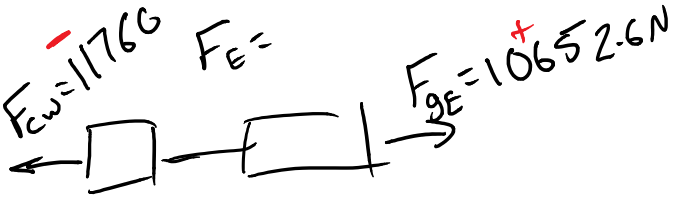
Counter weight = 1200kg



TF a 75 kg person is



If a 75 kg person is in the elevator, how hard will the engine work to raise them at a constant velocity? $a=0$

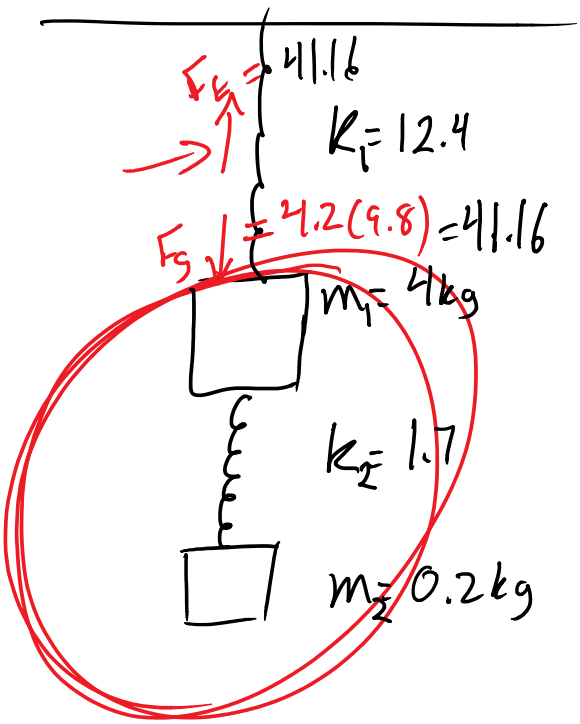


$$F_{Net} = F_{CW} + F_E + F_{gE}$$

$m_{sys}a$

$$0 = -11760 + F_E + 10652.6N$$

$$F_E = 1107.4N$$



a) Find out how far spring 2 is stretched.

b) Find out how far spring 1 is stretched

$$F_E = k\Delta x$$

$$\frac{41.16}{12.4} = \frac{12.4}{12.4}\Delta x$$

$$\Delta x = 3.32m$$

Forces Pkg Last Page