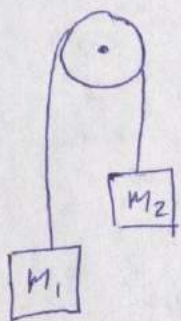


B6 An Atwood machine is a simple pulley

#1



$$m_1 = 8 \text{ kg}$$

$$m_2 = 5 \text{ kg}$$

What is the acceleration of the system?

① Start with $F = ma$ or $a = \frac{F_{\text{net}}}{m_T}$

② Calculate net force

$$F_{\text{net}} = m_1 g - m_2 g \quad \text{Why?}$$

③ Next divide by the sum of the masses.

$$\frac{F_{\text{net}}}{m_1 + m_2} = \frac{m_1 g - m_2 g}{m_1 + m_2} = a$$

④ Complete the problem by substituting values.

⑤ What is the tension in the string?

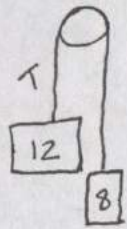
$$T_{1 \text{ or } 2} = m_1 g \pm m_1 a \quad \text{Should we add or subtract?}$$

⑥ Does T_1 equal T_2 ? Yes, No or Impossible to know

B6

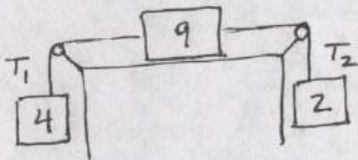
#2

1. An atwood machine has an 8 kg block hanging on one side and a 12 kg block hanging on the other side.



- A.) Find the magnitude of the acceleration of the blocks.
- B.) What is the tension in the string? (ignore the mass of the string)

2. Find the tension in each string for the 3-box system:

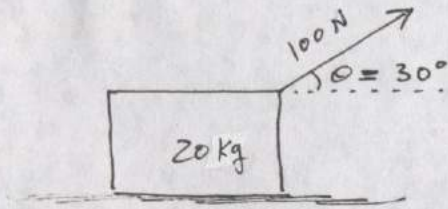


- a.) if there is no friction
- b.) if $\mu_k = .2$ for the surfaces of the table and 9 kg block.

B6

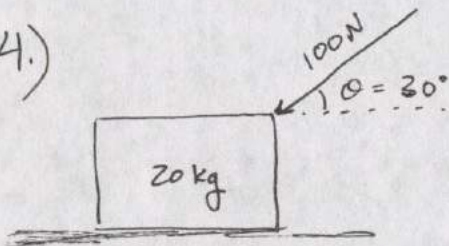
#3

3.)



A box is being pulled along the ground with a slanted force as shown. The coefficient of kinetic friction between the box and the ground is $\mu_k = .3$ a.) Find the acceleration of the box. b.) Find force normal.

4.)

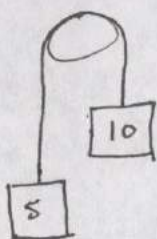


A box is being pushed along the ground with a slanted force as shown. The coefficient of kinetic friction between the box and the ground is $\mu_k = .3$ a.) Find the acceleration of the box. b.) Find force normal.

B6

#4

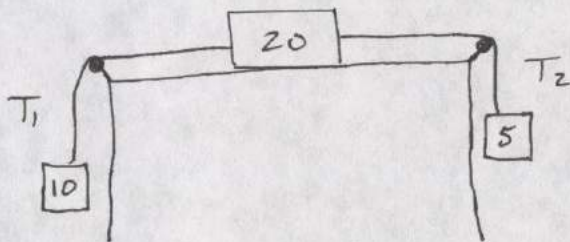
5.) An atwood machine has a 10 kg block hanging on one side and a 5 kg block on the other side.



A.) Find the magnitude of the acceleration of the blocks.

B.) What is the tension in the string?

6.) Find the tension in each string for the 3 box system:



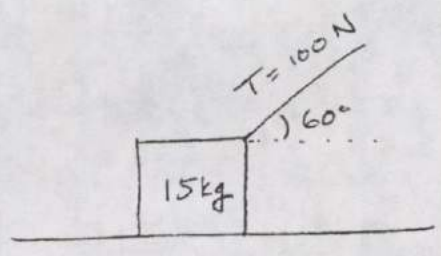
a.) if there is no friction

b.) if $\mu_k = 0.15$ between the 20 kg block and table.

7.)

Stationary Block

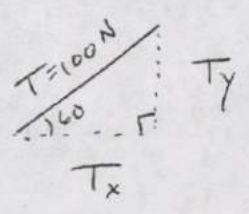
#5



Label the Free body diagram

a.) What is the normal force exerted by the table? $F_N = \text{normal force}$

b.) In what direction is the normal force?



c.) In what direction is the tension?

d.) In what direction is the gravitational force?

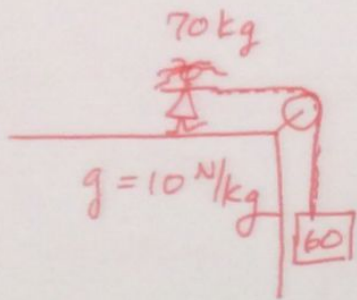
$$\sum \vec{F}_y = m a_y -$$

Solve for \vec{F}_N

$$\vec{F}_N + T_y - mg = m(0)$$

B6:

6



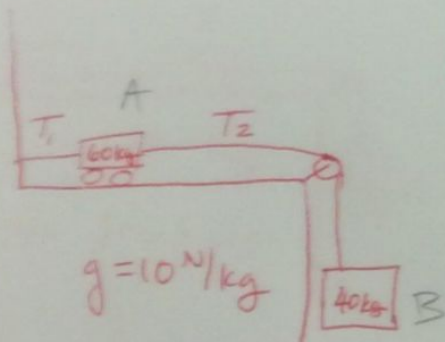
Dynamic

Frictionless Surface

1. Draw the force diagrams for
 - (a) the woman
 - (b) the 60 kg object
2. Determine acceleration (two ways).
3. Find tension.

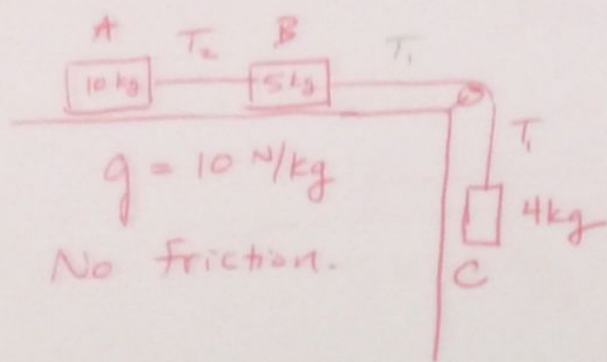
Static

Assume no friction.



- 4.) What is the acceleration of the system?
- 5.) What is the tension in T_1 ?
- 6.) What is the tension in T_2 ?

B6

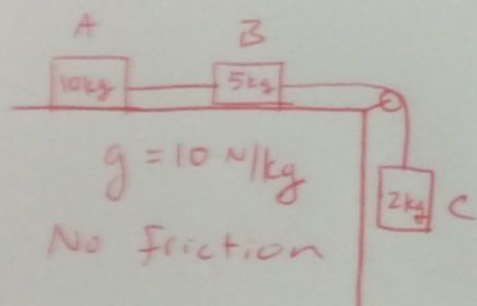


#7

1. What is the acceleration of the system?

2. What is T_1 ?

3. What is T_2 ?



4. What is the acceleration of the system?

5. What is T_1 ?

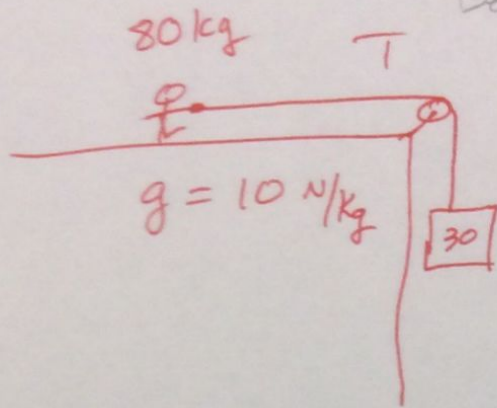
6. What is T_2 ?

56:

Dynamic

#8

Begin by drawing the force diagrams.



Part A $\mu_k = \mu_s = 0$

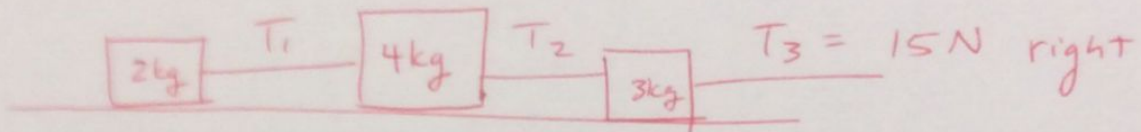
1. What is the acceleration of the system?
2. What is the tension?

Part B $\mu_k = .2$, Assume $T > F_{\text{static Friction}}$

1. What is the acceleration of the system?
2. What is the tension?

Assume no Friction.

Pg. 9



1. What is the acceleration of the system?
2. What is T_1 ?
3. What is T_2 ?