

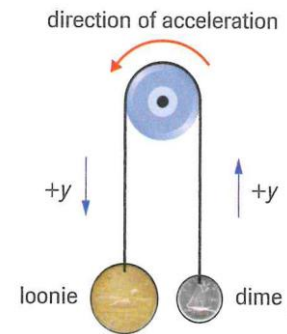
# Dynamics Assessment

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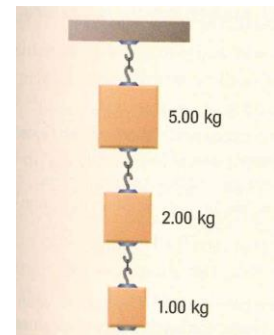
Name: \_\_\_\_\_ Date: \_\_MARCH 27, 2020\_\_

- Show all of your work for full marks. Include a FBD, governing equations, etc.

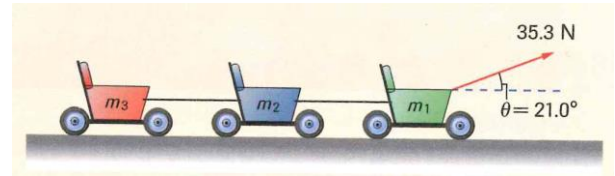
1. [ 5 marks ] Consider the situation before. An elaborate experiment was set up to determine the mass of a loonie. Through careful measurement it was found that the acceleration of the pulley system below was found to be  $5.29 \text{ m/s}^2$ . The mass of the dime was measured to be  $2.09 \text{ g}$ . Calculate the mass of the loonie.  
[assume no air resistance, the string are massless, and the pulley is frictionless]



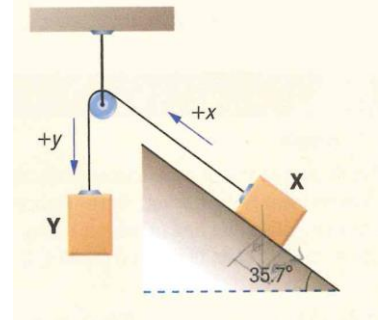
2. [ 5 marks ] Three masses are hanging by small threads attaching them. Calculate the tension in the middle thread. The system is not accelerating.



3. [ 5 marks ] A store clerk pulls three carts connected with two horizontal cords to move products from the storage room to the display shelves. The masses of the loaded carts are:  $m_1=15.0$  kg;  $m_2=13.2$ kg, and  $m_3=16.1$  kg. Friction is negligible. A third cord pulls on cart 1 and is at an angle of  $21.0^\circ$  above the horizontal. It has a tension of 35.3 N. Determine.
- the acceleration of the carts
  - the tension the middle cord (between 1 and 2)



4. [ 5+ marks ] Two blocks are connected to a frictionless, massless pulley. The coefficient of friction between block X and the ramp is 0.12.  $m_x = 5.12$  kg and  $m_y = 4.22$ . Calculate the tension in the rope.



5. [ 5 marks ] Three blocks of masses  $m_1 = 26 \text{ kg}$ ,  $m_2 = 38 \text{ kg}$  and  $m_3 = 41 \text{ kg}$  are connected by two strings over two pulleys. Calculate the coefficient of friction on the table (between block 2 and the table) if the acceleration of the system is  $0.80 \text{ m/s}^2$  CW.

