Name: _____ DISC: _____ Score: _____ / 20

Instructions:

- Do your own work.
- Answer the questions below in the space provided.
- Make sure you show all your work and any equations that you use.
- Please place a box around your answers.
- Remember to give the correct units with all numerical answers

Q1	Q2	Q3	Q4
5	5	5	5

1. You have just arrived on a new planet and wish to find its acceleration of gravity. You launch a ball vertically upward with an initial velocity of 3 m/s. The ball takes 6s to reach its maximum height.

   a. What happens to the velocity of the ball at its maximum height.

Answer (2pts):

   b. Use your answer in part a) to find g_{new} :

Set-up:
Algebra:
g_{new}:

2. A train traveling at 15 m/s approaches a station stop. It starts slowing with constant deceleration 250 m away from the station.

   a. Select the equation you would use to find the acceleration of the train?

Choice (2 pts):

   i. $x(t) = x_0 + v_0 t + \frac{1}{2} a t^2$

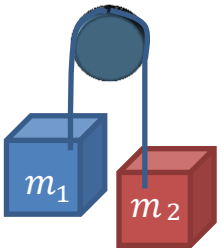
   ii. $v^2 = v_0^2 + 2\, a\, \Delta x$

   b. Use your chosen equation to find the acceleration (remember acceleration is a vector):

Information:
Solution (2 pts):

   i. Do you have all the information you need (yes/no)?
   ii. Solve for $\vec{a}$.

3. Consider a system of two blocks connected by a light-weight, flexible cord over a massless, frictionless pulley as shown below:



a. If a_1 is the acceleration of m_1 and a_2 is the acceleration of m_2:
   i. How are the magnitudes $|a_1|$ and $|a_2|$ related?
   ii. Explain your reasoning.

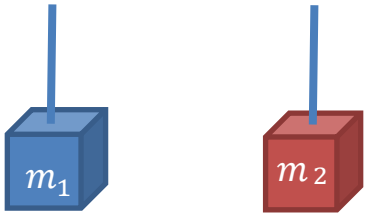
Answer:
Reasoning:

b. Let $m_1 = 10\ kg$ and $m_2 = 3\ kg$:
   i. What is the ***sign*** of the acceleration of m_1?
   ii. What is the ***sign*** of the acceleration of m_2?
   iii. Explain your reasoning.

a_1:
a_2:
Reasoning:

c. Draw a free-body diagram for each block on the figures below. *Remember to label the forces and include a coordinate system (don't forget about the string!).*

Block 1:
Block 2:
Coordinate System:



d. Forces:
   i. Write down the ***sum of the forces*** acting on m_1:
   ii. Write down the ***sum of the forces*** acting on m_2:

Forces on m_1:
Forces on m_2: