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, g_{new}. You throw a ball vertically upward with an initial velocity, $v_0 = 10 \ m/s$. The ball reaches a maximum height $y_{max} = 3 \ m$. Assume $y_0 = 0 \ m$.

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

   Answer (2pts):

   b. Of the following expressions, which would you use to find g_{new} the acceleration of gravity on the new planet:

   Expression (1 pt):

        i. $y(t) = y_0 + v_0 t + \frac{1}{2} a t^2$

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

        iii. $v = v_0 + at$

   c. Use your result in part a) and your chosen expression in part b) to find g_{new} :

   g_{new} (2 pts):

2. A train traveling in a straight line at $30 \ m/s$ needs to make an emergency stop. It takes $60 \ s$ for the train to come to a complete stop.

   a. Select the equation you would use to find the acceleration of the train?
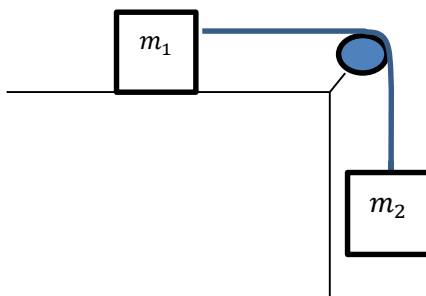
   Choice (2 pts):

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

        ii. $v = v_0 + at$

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

        i. Do you have all the information you need? ***choose one:*** yes/no

   Information:
   Solution (2 pts):

        ii. Solve for $\vec{a}$.

3. Two blocks are attached to each other by a massless cord as shown in the diagram below. Both the table and pulley are _frictionless_:

Coord. System (1 pt.):
Forces (2 pts):

a. Finish the free-body diagram by including all of the forces acting on the blocks. _Include a coordinate system_.
b. Can this system be in equilibrium? Explain your reasoning.

Answer:
Reasoning:

4. You are standing on a scale in an elevator. You read the weight on the scale.
a. The reading is _less_ than your weight outside the elevator. Which of the following is true:

Answer (2 pts):

i.   The elevator is undergoing negative acceleration.
ii. The elevator is undergoing positive acceleration.
iii. Neither of these is true.
iv. Both of these are true.

b. You look at the scale again. The scale now reads your weight as _the same_ as outside the elevator. Explain in your own words what has happened.

Explanation (3 pts.):

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