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 throw a ball vertically upward with an initial velocity, $v_0 = 21\ m/s$. The ball takes $5s$ to reach its maximum height.

   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. $v = v_0 + at$
      ii. $y(t) = y_0 + v_0 t + \frac{1}{2}at^2$
      iii. $v^2 = v_0^2 + 2\,a\,\Delta y$

   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 leaves a station and undergoes constant acceleration from rest. After traveling $0.9\ km$ in a straight line, the train reached a final speed of $15\ m/s$.

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

Choice (2 pts):

      i. $x(t) = x_0 + v_0 t + \frac{1}{2}at^2$
      ii. $v^2 = v_0^2 + 2\,a\,\Delta x$

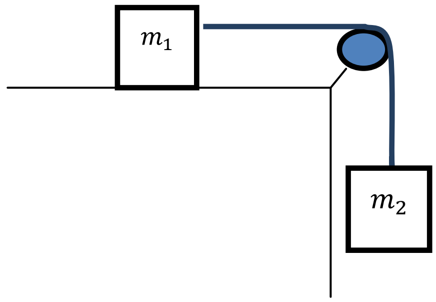
   b. Use your chosen equation to find the acceleration (remember acceleration is a vector):

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

Information (1 pt):
Solution (2 pts):

3. Two blocks are attached to each other by a massless cord over a pulley 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 which can act on the blocks. *Include a coordinate system*.
b. Can this system be in equilibrium? Explain your reasoning.

Answer (1 pt):
Reasoning (1 pt):

4. You are standing on a scale in an elevator. You read the weight on the scale.
a. The scale reads the same as your weight outside the elevator. Which of the following is true:

Answer (2 pts):

i. The elevator is slowing down.
ii. The elevator is speeding up.
iii. Neither of these is true.
iv. Both of these are true.

b. You look at the scale again. The reading is *greater* than your weight outside the elevator. Explain in your own words what has happened.

Explanation (3 pts.):