QUIZ 2 1AW21

Full Name (Printed) _____

Full Name (Signature) _____

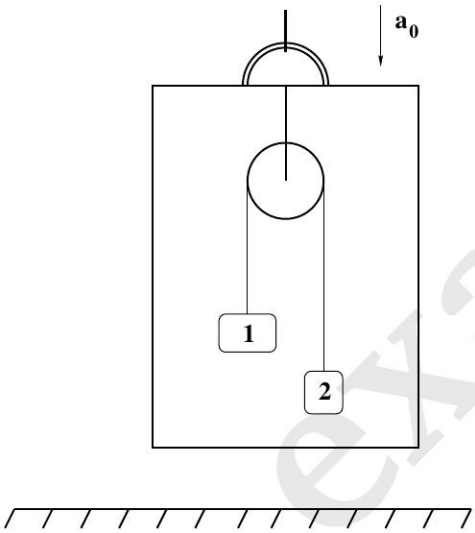
Student ID Number _____

- The exam is open-book and open notes. You will probably do better to limit yourself to a single page of notes you prepared well in advance.
- **All work must be your own.** You are not allowed to collaborate with anyone else, you are not allowed to discuss the exam with anyone until all the exams have been submitted (after the close of the submissions window for the exam).
- You have 30 minutes to complete the exam and sufficient time to scan the exam and upload it to GradeScope. The exam *must* be uploaded to GradeScope within the time alloted (that is, by the end of the first lecture hour). We will only except submissions through GradeScope and will not accept any exam submitted after the submission window closes (CAE students must contact Corbin for instructions).
- **Given the limits of GradeScope, you must fit your work for each part into the space provided.** You may work on scratch paper, but you will not be able to upload the work you do on scratch paper, so it is essential that you copy your complete solution onto the exam form for final submission. We can only consider the work you submit on your exam form.
- **For full credit the grader must be able to follow your solution from first principles to your final answer.** ***There is a valid penalty for confusing the grader.***
- It is **YOUR** responsibility to make sure the exam is scanned correctly and uploaded before the end of the submission window. The graders may refuse to grade pages that are significantly blurred, solutions to problems that are not written in the correct place, pages submitted in landscape mode and/or work that is otherwise illegible - if any of this occurs, you may not receive *any* credit for the affected parts.
- Focus on the concepts involved in the problem, the tools to be used, and the set-up. If you get these right, all that's left is algebra.
- **Have Fun!**

The following must be signed before you submit your exam:

By my signature below, I hereby certify that all of the work on this exam was my own, that I did not collaborate with anyone else, nor did I discuss the exam with anyone while I was taking it.

Signature _____



An Atwood machine consists of two massive blocks (m_1 and m_2) tied to the ends of a massless rope that is draped over a massless pulley, as shown. The massless pulley is, in turn, suspended by a second rope from the roof of an elevator that is accelerating *downward* with a magnitude $|\vec{a}| = a_0$.

- 2a) (5 points) To begin the problem, describe the frame of reference you will be working in to the grader. How will the axes be oriented? To what point will the origin be affixed? Explain the reasoning for each of these choices.

- 2b) (5 points) On the diagram, sketch the forces that act on each mass and the forces that act on the massless pulley. Write out (but do not yet attempt to solve) the force equations for each of these bodies.

- 2c) (5 points) At this point, you may have noticed that you have three equations (one for each body) and four unknowns. You'll need to identify a constraint. Use that constraint to obtain the necessary fourth equation.

- 2d) (15 points) Find the acceleration of each block and the tension in each rope in terms of the given information.