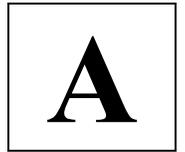


Exam 2

Recitation Section (see back of test): _____

- 1) Print your name, test form number (above), and nine-digit student number in the section of the answer card labeled "STUDENT IDENTIFICATION".
- 2) Bubble your test form number (**ABOVE**) in columns 1-3, skip column 4, then bubble in your student number in columns 5-13.
- 3) For each free-response question, show all relevant work supporting your answer. **Clearly box or underline your final answer.** "Correct" answers which are not supported by adequate calculations and/or reasoning will be counted wrong.
- 4) For each multiple-choice question, select the answer most nearly correct, **circle this answer on your test**, and bubble it in on your answer card. **Show all relevant work on your quiz.**
- 5) Be prepared to present your Buzzcard as you turn in your test. Scores will be posted to WebAssign after they have been graded. **Quiz grades become final when the next quiz is given.**
- 6) You may use a simple scientific calculator capable of logarithms, exponentials, and trigonometric functions. **Programmable engineering calculators with text or graphical capabilities are not allowed. Wireless devices are prohibited.**



Your test form is: **624**

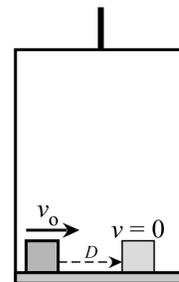
The image shows a Scantron answer card for a student named George P. Burdell. The student identification section is filled with the name and the student number 123 900987654. The test form number 624 is written above the bubbles in columns 1, 2, and 3. Column 4 is blank. The student number 900987654 is bubbled in columns 5 through 13. The answer section (questions 1-25) is mostly blank, with a few bubbles filled in. Annotations on the card include: "WRITTEN information for human benefit" in column 14, "Test Form Number from YOUR test column 4 is blank" in column 15, "YOUR student number starts in column 5" in column 16, and "Your answers" pointing to the answer section. The card also has a header "STUDENT IDENTIFICATION" and a footer "SCN-151-10" and "© SCANTRON CORPORATION 2002".

Our next test will be on Monday, November 02!

The following problem will be hand-graded. Show all your work for this problem. Make no marks and leave no space on your answer card for it.

- [I] (20 points) You are in an elevator that is at rest. You give a wooden block a shove across the rough elevator floor. Starting from an initial speed v_0 , the block slides a distance D before coming to a stop. You then feel the elevator start to move, and perform the same experiment, giving the block the same initial speed v_0 . You observe that this time, the block slides a distance $1.25D$ before coming to a stop.

What acceleration (magnitude and direction) is the elevator experiencing, during your second experiment? Express your answer as a multiple of g .



[Hint: think about the block's horizontal motion along the floor *separate* from the vertical motion of the whole elevator...]

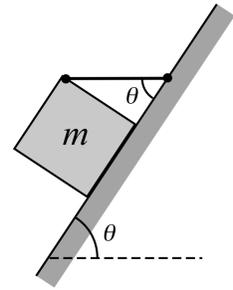
The quality and clarity of your free body diagrams will be graded, as part of your work on this problem!

The following problem will be hand-graded. Show all your work for this problem. Make no marks and leave no space on your answer card for it.

- [II]** (20 points) In the figure at right, a crate rests on a steep frictionless ramp inclined at an angle $\theta = 56.5^\circ$ above the horizontal. The block is held in equilibrium by a cord that is attached to the ramp in such a way that the cord is exactly horizontal.

Determine the tension in the cord and the normal force exerted by the ramp on the block. Express each force as some multiple of mg .

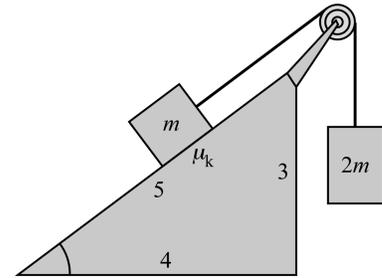
The quality and clarity of your free body diagrams will be graded, as part of your work on this problem!



The following problem will be hand-graded. Show all your work for this problem. Make no marks and leave no space on your answer card for it.

- [III]** (20 points) A block of mass m lies on a triangular wedge having the 3-4-5 geometry, as shown. The coefficient of friction between the block and wedge is $\mu_k = 0.25$. Block m is attached to an ideal cord that passes over a massless and frictionless pulley, suspending a second block of mass $2m$.

Determine the tension in the cord and the magnitude of the two blocks' acceleration. Express the tension as some multiple of mg , and the acceleration as some multiple of g .



The quality and clarity of your free body diagrams will graded, as part of your work on this problem!

Question value 5 points

(1) A non-inertial reference frame is defined as:

- (a) a reference frame attached to an object of zero mass, and therefore having zero inertia.
- (b) a reference frame moving at constant velocity relative to some stationary reference frame.
- (c) any reference frame that is not stationary.
- (d) a reference frame in which Newton's laws of motion do not appear to be valid.
- (e) a reference frame that does not use conventional x - and y axes, such as a tilted coordinate system.

Question value 5 points

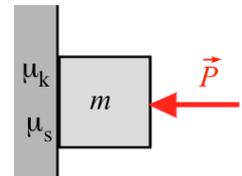
(2) A passenger riding in an elevator has a true weight $W = mg$. At a particular moment when the elevator is in motion, the passenger feels an apparent weight W^* that is greater than W . Which of the statements below provide a possible description of the elevator's motion?

- (a) The elevator is moving upward at constant speed.
- (b) The elevator is moving upward at decreasing speed.
- (c) The elevator is moving downward at constant speed.
- (d) The elevator is moving downward at increasing speed.
- (e) The elevator is moving downward at decreasing speed.

Question value 5 points

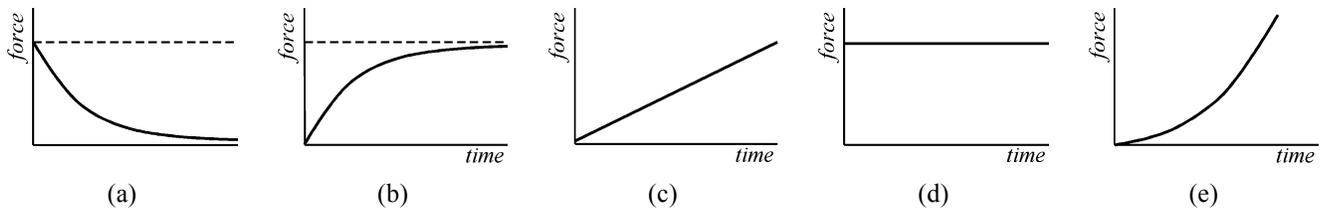
(3) A block of mass m is pressed against a vertical wall by a force P . The coefficients of friction between the block and the wall are μ_s and μ_k . The block does not move. The magnitude of the friction force exerted by the surface on the block is:

- (a) $\mu_s P$
- (b) mg
- (c) P
- (d) $\mu_s mg$
- (e) P/μ_s



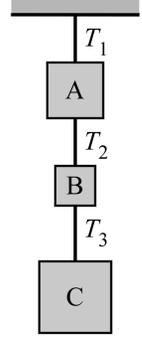
Question value 5 points

(4) A skydiver steps out of a hot-air balloon that is floating stationary, 3km above the ground. Which of the graphs below best depicts the magnitude of the drag force acting on the skydiver as a function of time (*before* she deploys any parachute)?



The next two questions involve the following situation:

Three blocks hang from the ceiling as shown in the figure at right, with $M_A = 2m$, $M_B = m$, and $M_C = 3m$. The blocks are attached to each other via ideal cords (massless and unstretchable), having tensions T_1 , T_2 , and T_3 as shown.



- Question value 5 points*
- (5) According to the 3rd Law, what force is paired with the tension T_2 pulling up on block B?
- Tension T_3 pulling down on block B.
 - Weight mg pulling down on block B.
 - Tension T_3 pulling up on block C.
 - Tension T_2 pulling down on block A.
 - Weights mg and $3mg$ pulling down on block B.

- Question value 5 points*
- (6) Rank, from greatest to least, the tensions in the three cords.
- $T_3 > T_1 > T_2$
 - $T_1 = T_3 > T_2$
 - $T_3 > T_2 > T_1$
 - $T_2 > T_1 > T_3$
 - $T_1 > T_2 > T_3$

The next two questions involve the following situation:

The Zombie Apocalypse has arrived! Rick is driving an SUV along a straight stretch of highway, when a zombie drops onto the hood of his vehicle from an overpass. Glen is standing stationary on the shoulder of the highway at the moment this happens. After a few moments freaking out, Rick slams on the brakes and the zombie tumbles off the front of the hood.

Question value 5 points

- (7) From Rick's perspective (i.e. *frame of reference*) in the truck...
- (a) ...the zombie experiences a friction force directed *forward*, while accelerating *backward* relative to the hood.
 - (b) ...the zombie experiences a friction force directed *forward*, while accelerating *forward* relative to the hood.
 - (c) ...the zombie experiences a friction force directed *backward*, while accelerating *backward* relative to the hood.
 - (d) ...the zombie experiences a friction force directed *backward*, while accelerating *forward* relative to the hood.

Question value 5 points

- (8) From Glen's perspective (i.e. *frame of reference*) on the ground...
- (a) ...the zombie experiences a friction force directed *forward*, while accelerating *backward* relative to the ground.
 - (b) ...the zombie experiences a friction force directed *backward*, while accelerating *forward* relative to the ground.
 - (c) ...the zombie experiences a friction force directed *forward*, while accelerating *forward* relative to the ground.
 - (d) ...the zombie experiences a friction force directed *backward*, while accelerating *backward* relative to the ground.

PHYS 2211 A/B Recitation TA and Room Assignments

Tests will be returned in recitation, ideally in the *same* week as the test is given. In order to ensure that you receive your test back as soon as possible, please enter your recitation section from the table above on the front of this test.

	Clough 123	Clough 125	Clough 127	Clough 131
WEDNESDAY				
1:05 – 1:55 pm	B01 Dark, Jason			
2:05 – 2:55 pm		A01 Coenen, Ashley		
3:05 – 3:55 pm			B06 Coenen, Ashley	A05 Cowan, Erika
4:05 – 4:55 pm	B05 Eswar, Aditya	B02 Dark, Jason	A02 Coenen, Ashley	A06 Cowan, Erika
THURSDAY				
1:05 – 1:55 pm				
2:05 – 2:55 pm	A03 Eswar, Aditya	B08 Cowan, Erika	B03 Dark, Jason	
3:05 – 3:55 pm			A07/B07 Dark, Jason	
4:05 – 4:55 pm	A04 Eswar, Aditya		B04 Dark, Jason	
5:05 – 5:55 pm			A08 Dark, Jason	