Newton, Isaac

phys1110 **Section 14**
Due Thr, Dec 25, 2008 at 12:12 Set 1
CAPA ID 7890

All answers should be submitted on the web at **http://capa.colorado.edu/CAPA/class.html**

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1. [2pt] Match each quantity with the appropriate symbol for its unit, in the SI system (If the first quantity corresponds to B, and the next 4 to C, enter BCCCC).

1) time	A. m^2
2) acceleration	B. m/s^2
3) length	C. m
4) velocity	D. s
5) speed	E. kg
	F. m/s

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2. [2pt] The speed of a vehicle is 3.56 meters per second. Select from the list below all of the answers which express that speed using metric units AND which are formatted so that CAPA can judge the answer. [* means multiply, ^ means raise to a power, / means divide] (Entering the NUMERICAL VALUE and the UNIT of a quantity: The numerical value is entered with NO blank spaces. Then put in a space. Then enter the desired unit. Note: 3.56E-8 is a way you can enter the number 3.56×10^{-8} to CAPA, and most calculators.
Give ALL correct answers in alphabetical order, i.e., B, AC, BCD...)

A) `3.56ms^-1`
B) `3.56m/s`
C) `3.56 m/s`
D) `3.56E-3 km/s`
E) `3.56 m*s^-1`
F) `3.56E2 cm*s^-1`

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3. [2pt] A gas cylinder is being filled. The density of the gas in the cylinder is increasing at the rate of 0.0047 kilograms per meter cubed per second. Select all of the answers which express that rate using metric units AND which are formatted so that CAPA can judge the answer. (Give ALL correct answers in alphabetical order, i.e., B, AC, BCD...)

A) `0.0047 kg*m^-3*s^-1`
B) `0.0047 kg/m^3*s^1`
C) `4.7g*m^-3*s^-1`
D) `4.7E-6 g/(cm^3*s^1)`
E) `4.7 E-6 g*cm^-3*s^-1`
F) `4.7 g*m^-3*s^-1`

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4. [0pt] This is an example essay question. Things to note: CAPA will show you what it has stored (i.e. your last entry) in the "Current submission" box. That's what we are going to see. CAPA does NOT save any older drafts! If you want to edit the submission, you'll have to "copy and paste" from that box into the blank entry box, and edit there. You have essentially unlimited (99) edits available. The score at the top (which normally says "Y" or "N") is different, it will first say "A" and later, will be a numerical score. (Probably 0) These essays will be graded by a human grader, probably well after the set is due. You can see your scores later by logging into CU Learn. You can't do anything very fancy here (no graphics, or attachments, or fonts...). I personally think it's easiest to write your essay in your favorite text editor, and when you're happy, just cut and paste it right into the box. (Some word wrapping may get a little mucked up, though, just won't look quite as pretty)

Why are you taking this course?

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5. [2pt] Select ALL the valid statements, i.e., B, AC, BCD. If an equation is dimensionally

A) correct, the equation may be wrong.
B) incorrect, the equation may be correct.
C) correct, the equation must be correct.
D) correct, the equation may be correct.
E) incorrect, the equation must be wrong.

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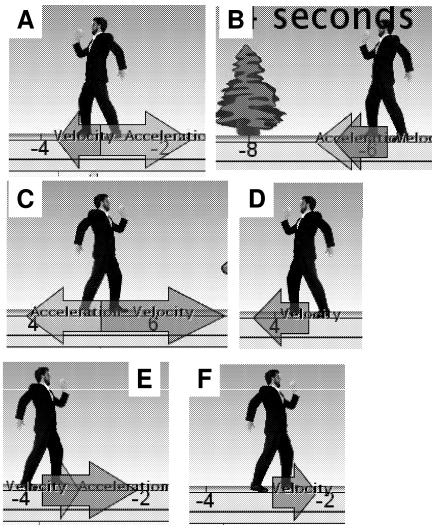
6. [2pt] In this problem, we will be using the Moving Man Simulation. It's available online from the class homepage: Or go to http://phet.colorado.edu and search Moving Man

The following image shows 6 scenarios from the Moving Man Simulation. Play around with the Moving Man simulation until you gain an intuition as to how the motion of the moving man relates to his velocity and acceleration vectors and graphs.



Look at each statement below, and decide which of these scenarios applies in each case. In the space at the bottom, enter a string of letters. If you think the first question applies to scenarios E and F, the 2nd to A and B, and the 3rd to E ONLY, enter 1EF2AB3E (numbers are separating your answers to each problem). For EACH statement, the correct answers need to be entered alphabetically (1FE2BA3E would NOT work, neither would EFABE). (No spaces, no quotes, no other characters!)
1. The man is speeding up.
2. Acceleration is negative.
3. Velocity is negative.

NOTE: There are more questions on the back!

7. [2pt] Here, we will be using the Moving Man Simulation. It's available online from the class homepage: Or go to http://phet.colorado.edu and search Moving Man
Play around with the Moving Man simulation until you gain an intuition as to how the motion of the moving man relates to his acceleration.
After playing for a bit, come back here and decide whether each of the following statements are T-True, or F-False. (If the first is T and the rest are F, enter TFFFF)

A) If the speed is decreasing, the acceleration must be negative.

B) Velocity and acceleration are always the same sign (both positive or both negative).

C) Negative acceleration means the man must be slowing down.

D) If the acceleration is zero, the man must be standing still.

E) A negative velocity is always moving toward the tree.

Be careful to input your answer as a string of 5 T's and F's, in order. (No spaces or any other characters)

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8. [2pt] The Olympic Track and Field Team coach wants to analyze the motion of the 100-yard dash runners. One of the runners has the highest finishing velocity of any one in the world, but has never won a race. How can this be? What should this runner work on in order to start winning races? Throughly explore the moving man simulation to identify the key features that will minimize the runners time. Explain these key features to the coach and why this runner isn't winning. What does this runner need to do to win? (You will be graded both on the physics ideas and the clarity of your explanation to the coach).

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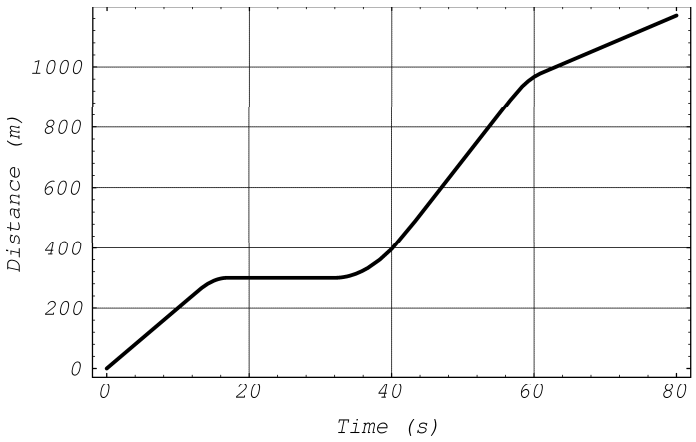
9. [2pt] A car travels a certain distance along a straight road (in the +x direction). The distance the car travels as a function of time is shown in the figure below. When the car changes speed it does so uniformly. Select the appropriate choice for each statement: T-True, F-False, G-Greater than, L-Less than, E-Equal to. (If the first is T, the second is G, and the rest E, enter TGEEEE).



Please note carefully: If a statement has "....." , that represents a blank to fill in (with G, L, or E) . Don't use "T" or "F" for those!!

A) The x-acceleration is ..... zero at 10 sec .

B) The speed is ..... zero at 20 sec.

C) The speed at 67 sec is ..... the speed at 10 sec.

D) At 46 sec, the speed is as high as it gets.

E) The x-acceleration is ..... zero at 15 sec .

F) The acceleration magnitude at 37 sec is ..... the acceleration magnitude at 15 sec.

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10. [2pt] My car travels on a straight stretch of busy highway for 75 km at a steady 25 km/hr. The traffic then eases up, and I continue in the same direction for another 20 km at 60 km/hr. What is the average velocity of my car during this entire trip? (Assume that I'm moving in the positive-x direction.) (NOTE: You need to input correct units here) Also note: if you get a problem wrong, CAPA will produce a generic "hint". It's the same for everyone, it doesn't matter what you actually typed. (If you're ever totally stuck and can't find a person to help, I suppose you might consider giving up one try, to see the hint...)

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11. [2pt] The car in the previous problem turns around abruptly and speeds back to where it started taking an additional 2.67 hours. What is the average speed of the car for the entire round trip, starting and ending at the origin?

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12. [2pt] In this problem, we will be using the Maze Game Simulation. It's available online from the class homepage: Or go to http://phet.colorado.edu and search Maze Game
Using the Maze Game Simulation, Play Level 1 using each of the 3 methods for control (R (position), V, A). You'll find that completing Level 1 under acceleration control is the most challenging, but is also a great way to gain an intuition for acceleration. The current record is 5.0 seconds! Record your times, and describe your strategy for minimizing your time when using the acceleration control. Be sure to back your strategy with the physics principles.
