PHY 2130 EXAM 1 B January 25, 2013

Name (print): _____
(Last) (First)

WSU ID Number (9 digit): _____

Please circle your quiz section:

Monday	11:45 AM	(K. Dhindsa)
Tuesday	10:40 AM	(J. Huang)
Wednesday	11:45 AM	(K. Dhindsa)
Thursday	10:40 AM	(J. Huang)

Instructions:

1) Print your name and ID number at the top. Indicate on the scantron sheet which exam you have (A or B) by marking either "A" or "B" in a blank area near the top center of the scantron sheet.

2) Keep the cover of exam CLOSED until the exam has started!

3) Using a pencil, fill out the answer sheet boxes and bubbles with your name and identification number (include leading 0's in ID number) before starting the exam (you do not need to include date of birth, grade, sex, etc.).

4) You will have 55 minutes to do the exam.

5) The scantron sheet will not be returned. You will get back the exam itself from your quiz instructor. An exam key will be posted on Blackboard/lecture website.

6) You may use a non-graphing calculator. No other electronic devices may be used. Cellphones, PDAs, etc., cannot be used as a calculator.

7) When you are finished with the exam, please bring your student ID, the answer sheet and the exam to the instructor.

8) You are ***NOT*** to use notes or books during the exam, or to communicate with another student, or to look at another student's exam. Any violation can result in a grade of "zero" for this exam or a failing grade for this course.

All questions carry the same weight.

1. If the radius of a spherical balloon shrinks to 79% of its original value, its new volume is what percentage of the original volume?

A. 63%
B. 79%
C. 92%
D. 49%
E. 89%

2. Write the solution to 28.84 m divided by 6.2 s with the correct number of significant figures.

A. 4.6516 m/s
B. 4.652 m/s
C. 4.65 m/s
D. 4.7 m/s
E. 5 m/s

3. A legal freeway speed limit in Canada is 100 km/h. What is it in miles/h? You can round your answer to the nearest integer.

A. 70 mi/h
B. 161 mi/h
C. 55 mi/h
D. 100 mi/h
E. 62 mi/h

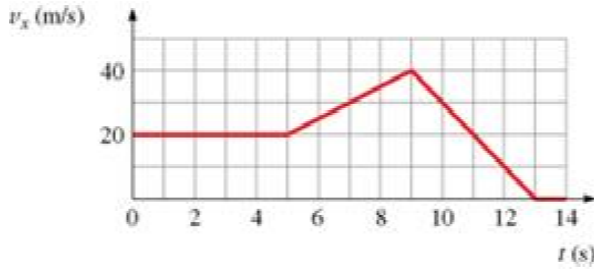
4. A car traveling at 10.0 m/s accelerates at 3.0 m/s^2 for 4.00 s. How far does it travel during this 4.00 s?

A. 40 m
B. 64 m
C. 24 m
D. 16 m
E. 45 m

5. A ball is thrown vertically into the air with an initial velocity of 20.0 m/s. Assume no air resistance. The time it takes the ball to return to the ground is:

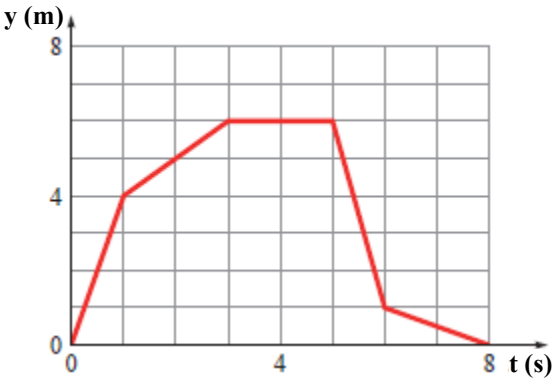
A. 0.8 s
B. 4.1 s
C. 3.2 s
D. 1.9 s
E. 5.0 s

6. The figure below shows the graph of velocity v_x versus time for an object moving along the x-axis. What is the acceleration at t = 10 s?



A. -10 m/s^2
B. 1.5 m/s^2
C. 0.0 m/s^2
D. 2.4 m/s^2
E. 4.0 m/s^2

7. The graph to the right shows the position y in m of a squirrel running up a flagpole but sliding back down. What is the velocity of the squirrel at 5.5 s?



A. -6.0 m/s
B. -0.5 m/s
C. 5.0 m/s
D. -5.0 m/s
E. 6.0 m/s

8. A cyclist travels 10.0 km east in a time of 11 min 40 s. What is his average velocity in meters per seconds?

A. 877 m/s east
B. 14.3 m/s east (problem 2.7)
C. 23.2 m/s west
D. 0.88 m/s east
E. 21.4 m/s east

9. A cat walks 8.0 m north, 5.0 m east and then 6.0 m south. What is the magnitude of the cat's displacement from the starting point?

A. 6.3 m
B. 4.0 m
C. 5.4 m
D. 7.2 m
E. 3.2 m

10. The velocity vector of a sprinting cheetah has x- and y-components $v_x = +16.4\ m/s$ and $v_y = -26.3\ m/s$. The magnitude and the angle that velocity vector makes with the +x axis are

A. 42.7 m/s and 32.1° with the +x axis
B. 9.9 m/s and -31.9° with the +x axis
C. 31.0 m/s and -58.1° with the +x axis (problem 3.20)
D. 31.0 m/s and -31.9° with the +x axis
E. 42.7 m/s and 58.1° with the +x axis

11. Tom and Jerry release their snowballs from the same height and at the same time. Tom's is dropped while Jerry's is thrown horizontally. Which one hits the ground first? Assume no air resistance.

A. the "dropped" snowball
B. the "thrown" snowball
C. they hit the ground at the same time
D. it depends on how hard Mary threw her snowball
E. it depends on the initial height

12. A skydiver is falling straight down at 55 m/s when he opens his parachute and slows down to 8.3 m/s in 3.5 s. What is the average acceleration of the skydiver during those 3.5 s?

A. 55 m/s^2 down
B. 9.8 m/s^2 down
C. 55 m/s^2 up
D. 13 m/s^2 up (problem 3.39)
E. 13 m/s^2 down

13. An object is launched from the origin with a velocity of 20.0 m/s at an angle of 30.0 degrees above the horizontal. What are the x- and y-components of the velocity 3.00 s later?

A. V_x = 16.8 m/s, V_y = 3.95 m/s
B. V_x = 17.3 m/s, V_y = 19.4 m/s
C. V_x = 17.3 m/s, V_y = -19.4 m/s
D. V_x =15.2 m/s, V_y = 3.55 m/s
E. V_x = 16.8 m/s, V_y = -3.95 m/s

Possibly useful equations:

Chapter 1

- Surface area of a sphere: $S = 4\pi r^2$ (r is a radius)
- Surface area of a cube: $S = 6a^2$ (a is a side)
- Volume of a sphere: $V = \frac{4}{3}\pi r^3$
- Volume of a cube: $V = a^3$
- Quadratic equation: $ax^2 + bx + c = 0$, solution: $x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Chapter 2

- Displacement (change in position): $\Delta\vec{r} = \vec{r}_f - \vec{r}_i$.
- Average velocity: $\vec{v}_{av} = \dfrac{\Delta\vec{r}}{\Delta t}$
- Average acceleration: $\vec{a}_{av} = \dfrac{\Delta\vec{v}}{\Delta t}$
- Constant acceleration equations:

$$\Delta v_x = v_{fx} - v_{ix} = a_x t$$
$$\Delta x = x_f - x_i = \tfrac{1}{2}\left(v_{fx} + v_{ix}\right)\Delta t$$
$$\Delta x = v_{ix}\Delta t + \tfrac{1}{2} a_x \left(\Delta t\right)^2$$
$$v_{fx}^2 - v_{ix}^2 = 2a_x \Delta x$$

- $g = 9.80 \frac{m}{s^2}$

Chapter 3

- Two-dimensional motion

$$\sin = \frac{opposite}{hypotenuse} \qquad \cos = \frac{adjacent}{hypotenuse} \qquad \tan = \frac{opposite}{adjacent}$$

Right triangle: $a^2 + b^2 = c^2$

Conversion factors

1 m = 39.37 inches
1 km = 1000 m = 100,000 cm
1 mi = 1.609 km
1 kg = 2.20 lb