Physics 1050-01,02 - Exam 1 Name_____

Allowed: calculators, pens, pencils.
Not allowed: books, notes, smart phones, etc.
The exam will end at 1:40 (total time is 65 minutes). 100 total points.

A. Multiple choice: circle the most appropriate answer (4 points each)

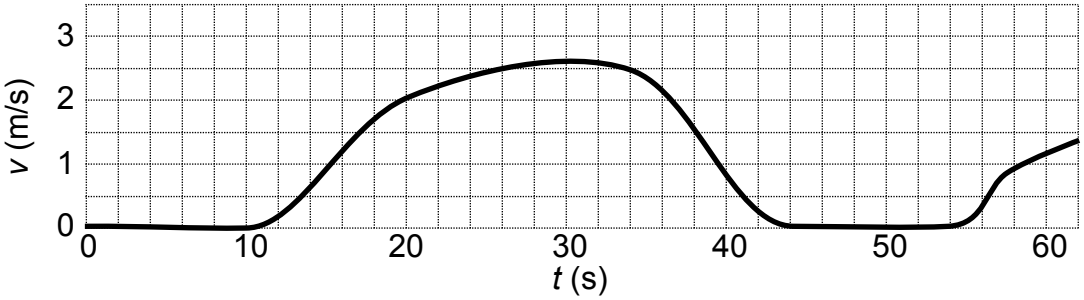
1. How many significant figures does 32.4 + 518.7351 have?
    a. 2
    b. 3
    c. 4
    d. 5
    e. 7

2. Two balls are dropped off of a tower at the same time. The balls are identical except that one is twice as heavy as the other. Neglecting air resistance, the time to reach the ground will be
    a. twice as long for the lighter ball
    b. longer for the lighter ball but not twice as long
    c. the same for both balls
    d. longer for the heavier ball but not twice as long
    e. twice as long for the heavier ball

3. In which of the following does a car have a negative velocity and a negative acceleration?
    a. traveling in -x direction and increasing speed
    b. traveling in -x direction and decreasing speed
    c. traveling in -x direction and constant speed
    d. traveling in +x direction and increasing speed
    e. traveling in +x direction and decreasing speed

4. You bike 5 miles at 8 miles/hour (mph) and then 5 miles at 16 mph. What is your average speed for the whole 10 mile trip?
    a. equal to 8 mph
    b. more than 8 mph but less than 12 mph
    c. equal to 12 mph
    d. more than 12 mph
    e. not enough information

5. The following graph shows the velocity of a car as a function of time. Which of the following is a true statement? (circle only one)
    a. the car was going backwards at $t = 40$ s
    b. the car was stopped at $t = 31$ s
    c. the car's acceleration was negative at $t = 20$ s
    d. the car's x position never decreased
    e. all of the above



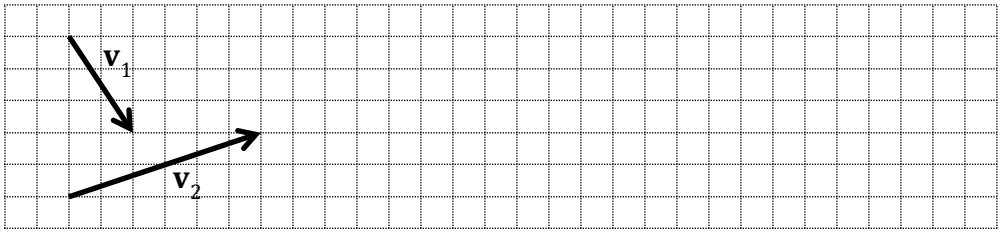
6. You are in the middle of a field. You walk in a straight line for 50 m, then turn right, then walk 50 m more in another straight line. When you stop, you are 50 m from your starting point. By how many degrees did you turn, relative to your initial direction?
    a. 30°
    b. 90°
    c. 120°
    d. 180°
    e. This is impossible. You can't walk 100 m and be 50 m from the starting point.

7. A baseball is hit high and far. Which of the following statements is true? At the highest point,
    a. the magnitude of the velocity is zero
    b. the magnitude of the velocity is its lowest value
    c. the magnitude of the acceleration is zero
    d. the magnitude of the acceleration is decreasing
    e. none of the above are true

Short answer (6 points each)

8. Give an example of positive acceleration and zero velocity.

9. Draw a picture that shows the sum of vectors $\mathbf{v}_1$ and $\mathbf{v}_2$. Label the sum as $\mathbf{v}_R$.



Longer answer (10 points each)
Give all answers with 3 significant figures and don't forget the units.

10. What is 70.0 miles per hour in meters per second?
Useful information:1 minute = 60 s; 1 mile = 5280 feet; 1 hour = 60 minutes; 1 inch = 2.54 cm; 1 foot = 12 inches.

11. A car traveling 85 km/h is 250 m behind a truck traveling 70 km/hr. How long will it take the car to reach the truck? (Hint: draw a graph of position versus time.)

12. A runner accelerates from rest to 8.00 m/s in 1.42 s. What is her acceleration?

13. A baseball is hit almost straight up in the air with a speed of 25 m/s. (a) How high does it go? (b) How long is it in the air?

a.

b.

14. A diver running 2.8 m/s dives out horizontally from the edge of a vertical cliff and reaches the water below 3.2 s later. (a) How high was the cliff? (b) How far from its base did the diver hit the water?

a.

b.

15. A light plane is headed due north with a speed relative to still air of 180 km/h. After 1.00 h, the pilot notices that they have covered only 135 km and their direction is not south but 17.0° east of south. What is the wind velocity?