

PHYSICS 1 - SELF TEST CHAP 3

Name \_\_\_\_\_  
(39 total points)

Acceleration of gravity:  $g = 10 \text{ m/s}^2$   
 $v = \Delta d / \Delta t$      $a = \Delta v / \Delta t$      $v_f = at$      $d = 1/2 at^2$      $v_{av} = (v_o + v_f) / 2$

For projectile motion (horizontal launch)

**Horizontal**  
 $x = v \cdot t$

**Vertical**  
 $h = 5 \cdot t^2$

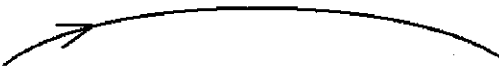
Choose the word that best describes the phrases given here and write it in the blank.

Components    free fall    horizontal    projectile    resultant    scalar    vector

- \_\_\_\_\_ 1. In the x-direction.
- \_\_\_\_\_ 2. A quantity that has magnitude/size only.
- \_\_\_\_\_ 3. A single vector can be represented by two of these.
- \_\_\_\_\_ 4. A quantity that has both magnitude and direction.
- \_\_\_\_\_ 5. Motion under the influence of gravity only.
- \_\_\_\_\_ 6. An object that moves through space acted on only by gravity.

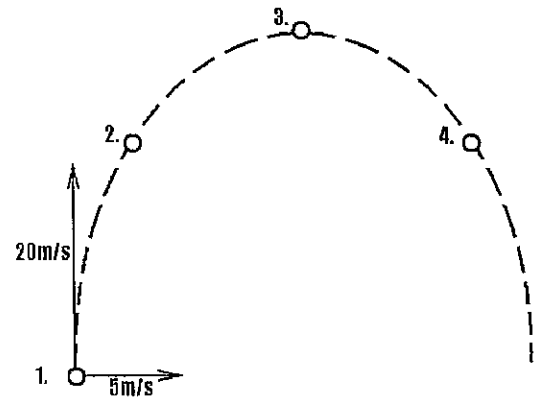
**Multiple Choice – Pick the best answer**

- \_\_\_ 7. Which one(s) of the following are vector quantities?  
a. volume    b. speed    c. temperature    d. velocity    e. none
- \_\_\_ 8. When you look at the speedometer in a moving car, you can see the car's:  
a. instantaneous speed  
b. average speed  
c. instantaneous acceleration  
d. average acceleration
- \_\_\_ 9. What is the maximum resultant when adding a 5 unit force to a 9 unit force? Draw a diagram.  
a. 4 units    b. 5 units    c. 7.2 units    d. 14 units    e. 45 units
- \_\_\_ 10. What is the minimum resultant when adding a 5 unit force to a 9 unit force? Draw a diagram.  
a. 4 units    b. 5 units    c. 7.2 units    d. 14 units    e. 45 units
- \_\_\_ 11. What is the resultant when adding a 5 unit force to a 9 unit force when the forces act at right angles? Draw a diagram.  
a. 4 units    b. 5 units    c. 10.3 units    d. 14 units    e. 45 units
- \_\_\_ 12. A single vector can be replaced by two vectors; one acting along the horizontal, the other acting along the vertical. These horizontal and vertical vectors are called:  
a. the resultant    b. components    c. scalars    d. magnitudes
- \_\_\_ 13. The word magnitude means:  
a. direction    b. weight    c. size    d. force

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14. A force of 3 units acts directly north and a force of 5 units acts directly west.
- Draw a single force which is the vector sum of these two forces.
  - Indicate the direction of the vector sum by an arrowhead.
  - Indicate the magnitude of the vector sum by placing a number on it.
- \_\_\_ 15. A fast moving marble rolls off a table and falls to the floor. While the marble is falling, its vertical speed:  
a. increases b. decreases c. remains the same
- \_\_\_ 16. A fast moving marble rolls off a table and falls to the floor. While the marble is falling, its horizontal speed:  
a. increases b. decreases c. remains the same
17. A marble moving at a speed of 4.0 m/s rolls off of a table which is 0.80 m high. How long does it take to reach the floor?  
Show your work.
18. A marble moving at a speed of 4.0 m/s rolls off of a table which is 0.80 m high. How far from the edge of the table does it land? Show your work.
- \_\_\_ 19. If the marble in question 17 & 18 had been moving faster than 4.0 m/s, the time taken to reach the floor would be:  
a. more b. less c. remain the same.
- \_\_\_ 20. If the marble in question 17 & 18 had been moving faster than 4.0 m/s, the distance from the edge of the table would be:  
a. more b. less c. remain the same.
- \_\_\_ 21. A projectile is said to be in free fall because:  
a. it accelerates in both the horizontal and vertical directions  
b. the net force acting on it during flight is zero  
c. only the force of gravity acts on it  
d. the statement is false: a projectile is not in free fall
- \_\_\_ 22. A given projectile has a path similar to the one shown here.  
Which statement is true:  
a. the horizontal velocity stays the same throughout the flight  
b. on the way up the vertical velocity increases  
c. on the way down the horizontal velocity increases  
d. neither the horizontal or vertical velocities change during flight
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- \_\_\_ 23. Which projectile will land farther from its starting point?  
a. Projectile A launched at a speed of 50 m/s at an angle of  $30^\circ$  with the ground  
b. Projectile B launched at a speed of 50 m/s at an angle of  $60^\circ$  with the ground  
c. both the same
- \_\_\_ 24. Which projectile in #23 will stay up in the air for a longer time?  
a. A b. B c. both the same time

25. The diagram to the right shows the position(s) of a ball in 1 second intervals as it nears the top of its path after it was thrown into the air.

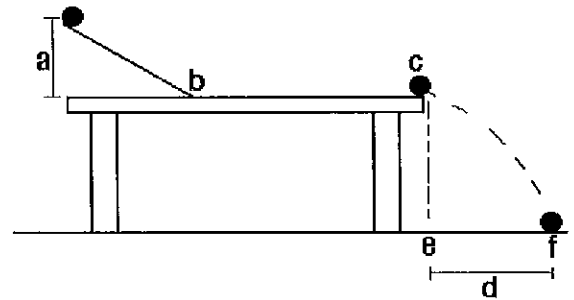
- Draw vectors representing its horizontal and vertical velocities in positions 2, 3, and 4.
- Show the *magnitude* of each.



26. In an experiment similar to the one we performed in the lab on projectiles a student got the following data:

- distance between b and c = 120 cm
- time for ball to roll from b to c = 0.60 s
- height of table = 0.80 m

- Calculate the distance d. Show all work and be sure to use proper units.



27. How would a taller table in #26 affect the distance d? Explain your answer.

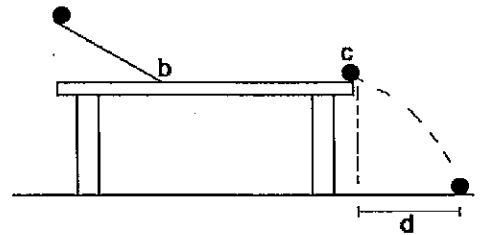
28. Alex Trebek, *Jeopardy!* host, throws a pathetic contestant horizontally from the studio rafters 20 m high. The person lands 30 m from the base of the rafters.

- a. How much time is the person in the air?
  
  
  
  
  
  
  
  
  
  
- b. With what horizontal speed did Trebek throw the person?

29. In a lab similar to ours, Galileo, mathematician and all around good guy, got the following data:

height of table:	0.80 m
distance between points b and c	100 cm
time for ball to travel between b and c	0.50 s

- a.) How far from the edge of the table will the ball land?  
**Show all work** in an organized fashion.



30. An arrow is shot with the velocity vectors shown.

- a. How long was the arrow in the air?
  
  
  
  
  
  
  
  
  
  
- b. How far did the arrow travel horizontally?

