Physics Honors

2010 / 11

Bomber Quiz

Name _____

Period _____

CHOOSE THE BEST POSSIBLE ANSWER!

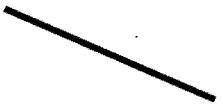
1. Which path below most accurately shows the motion of a physics book which was thrown horizontally across the room?

Bomber Problem

a. 

b. 

c. 

d. 

2. Which of the following would NOT be considered a projectile?

A. A cannonball thrown through the air.
B. A cannonball rolling down a slope.
C. A cannonball thrown straight up.
D. A cannonball rolling off the edge of a table.

3. The horizontal motion of a projectile:

A. is independent of the vertical motion.
B. increases as it falls to the ground.
C. is affected by gravity.
D. is always equal to zero.

4. If we ignore the effects of air resistance, a projectile accelerates:

A. in the horizontal direction only.
B. in the vertical direction only.
C. in both the horizontal and vertical directions.
D. at different rates depending on the angle it is launched at.

For questions 5 & 6, use the in formation below:

The marbles shown below are the same size, shape and mass. They are rolled off a cliff at the same time from a height of 5 m with the velocities as indicated:

A) vi = 0 m/s **B)** vi = 1m/s **C)**. vi = 5 m/ s

5. Which will hit the ground first?

A. marble A B. marble B C. marble C D. All will hit at the same time

6 Which will land farthest from the base of the cliff?

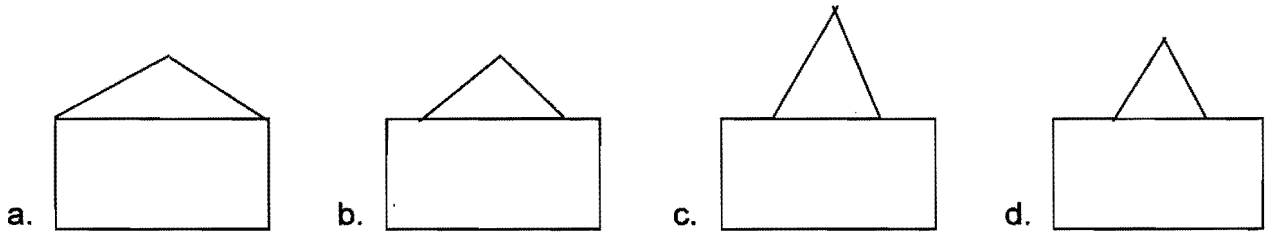
A. marble A B. marble B C. marble C D. All at the same distance

7. At the peak of its path, what do you know about a projectile?

a. The horizontal velocity is zero.
b. The vertical velocity is zero.
c. The vertical acceleration is zero.
d. The horizontal and vertical velocities are the same.

$a^2 + b^2 = c^2$ $\theta = \tan^{-1}\frac{y}{x}$ $Ax = A\cos\theta$ $Ay = A\sin\theta$

8. Which picture frame would be most likely to fall due to the greatest tension on the wires?



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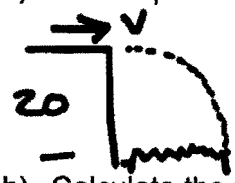
A cliff diver dives off a cliff that is 20.0 m high. There are several rocks at the bottom of the cliff that extend 8.00 m out into the water. In order to clear the rocks, the diver must get a running start off the cliff.

a) Draw a picture for the above scenario including the path of the projectile.

+1



Horizontal (x)	Vertical (y)

b) Calculate the time required for the diver to hit the water.

+2

$V_i = 0$

$V_f =$

$d = 20$

$a = 9.8$

$t = ?$

$d = \frac{1}{2} a t^2$

$20 = \frac{1}{2}(9.8)t^2 = 4.9t^2$

$t = \sqrt{\frac{20}{4.9}} = 2.02$ Sec

+2 c) Calculate the diver's **horizontal** velocity as he leaves the cliff?

$V = \frac{d}{t} = \frac{8}{2.02} = 3.96$ m/s

+1 d) What is the diver's **horizontal** velocity when he hits the water?

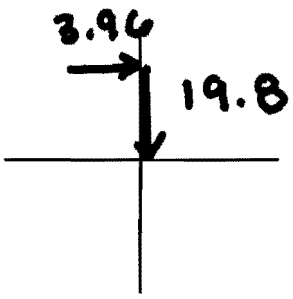
3.96 m/s

+2 e) What is the diver's **vertical** velocity when he hits the water?

$V_f = V_i + at$

$V_f = 0 + 9.8(2.02) = 19.8$ m/s

+4 f) Draw a vector diagram of the diver's velocity as he enters the water. Calculate the magnitude and the direction of the resultant vector. Remember vectors need a magnitude, angle and two sets of directions!



$V = \sqrt{3.96^2 + 19.8^2} = 20.2$ m/s

$\theta = \tan^{-1}\left(\frac{19.8}{3.96}\right) = 79°$

20.2 m/s @ 79° ABOVE HORIZONTAL