cannonball is launched

CLASS
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Practice Freefall and Projectiles Test

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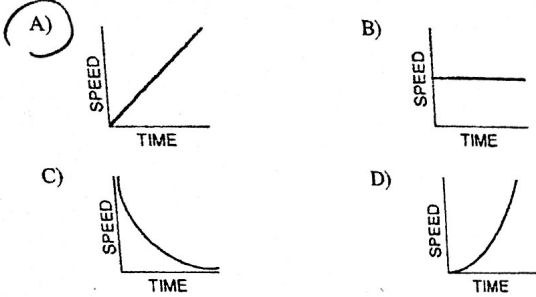
5.0m/s

$V_x = 5.000560$

1. Which graph best represents the motion of a freely falling body near the Earth's surface?

A)

B)

C)

D)

2. A projectile is fired with an initial velocity v_0 at an initial angle θ_0 with the horizontal. Which of the following pairs of graphs below best represents the horizontal components of the velocity, v_x and acceleration, a_x of the projectile as functions of time?

A)

B)

C)

D)

$2m = \frac{1}{2}\left(\frac{1.62}{9.81 m/s^2}\right)^2 (\Delta t)^2$
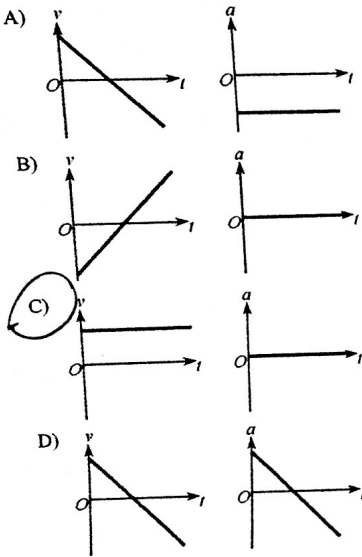
3. An astronaut drops a hammer from 2.0 meters above the surface of the Moon. If the acceleration due to gravity on the Moon is 1.62 meters per second^2, how long will it take for the hammer to fall to the Moon's surface?

A) 1.2 s   B) 2.5 s   C) 1.6 s   D) 0.62 s

4. The diagram below represents the relationship between velocity and time of travel for four cars, A, B, C, and D, in straight-line motion.

Velocity vs. Time
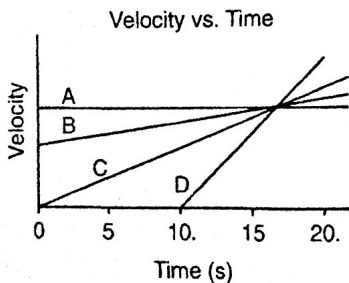
Which car has the greatest acceleration during the time interval 10. seconds to 15 seconds?

A) A   B) B   C) C   D) D

5. A basketball is thrown upwards on an arc at a 60 degree angle with the horizontal. If the velocity of the ball is 5 m/s how fast must the thrower run to catch the ball after it is released?

A) 20 m/s   B) 5.0 m/s   C) 2.5 m/s   D) 4.3 m/s   E) 10 m/s

6. A rock is dropped from a bridge. What happens to the magnitude of the acceleration and the speed of the rock as it falls? [Neglect friction.]

A) Acceleration increases and speed decreases.
B) Acceleration remains the same and speed increases.
C) Both acceleration and speed increase.
D) Both acceleration and speed remain the same.

7. The diagram below shows a projectile moving with speed v at the top of its trajectory.
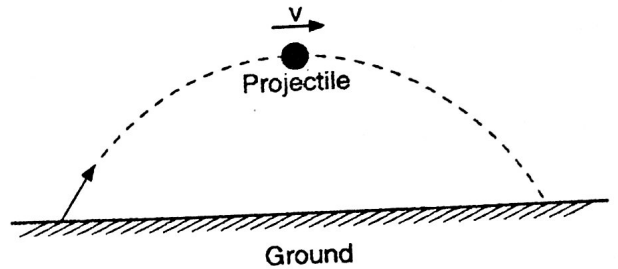
Which vector best represents the acceleration of the projectile in the position shown?

A)   B)   C)   D)

Base your answers to questions **8** and **9** on the following information.

$-20m = \frac{1}{2}(-9.81 m/s^2)(\Delta t)^2$

A ball is thrown horizontally 20 m above the ground with a velocity of 5 m/s.

8. How much time will pass before the ball hits the ground?

A) 2.8 s   B) 6 s   C) 9.2 s   D) 4.6 s   E) 2 s
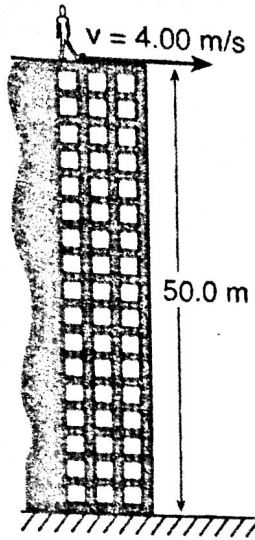
9. How far from the base of the cliff will the ball land?

A) 18.4 m   B) 12 m   C) 9.2 m   D) 5.6 m   E) 10 m

5m/s
20m

v = 4.00 m/s

50.0 m

Level ground
(Not drawn to scale)

$\Delta y = \frac{1}{2}at^2$

$50 = \frac{1}{2}(-9.8m/s^2)(\Delta t^2)$

How much time is required for the stone to reach the level ground below? [Neglect friction.]

A) 12.5 s   B) 3.19 s   C) 10.2 s   D) 5.10 s

11. Which graph best represents the relationship between the acceleration of an object falling freely near the surface of Earth and the time that it falls?

A)

Acceleration | Time

B)

Acceleration | Time

C)

Acceleration | Time

D)

Acceleration | Time
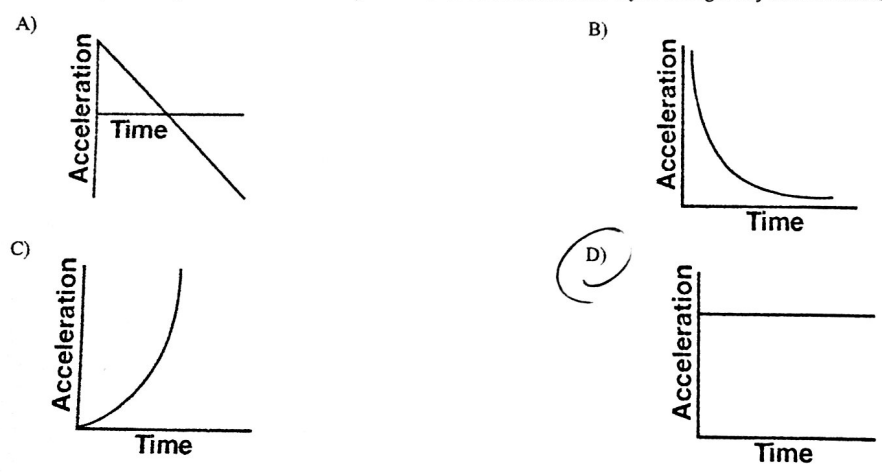
12. A rock dropped off a bridge takes 5 seconds to hit the water. Approximately what was the rock's velocity just before impact?

$v_{fy}^2 = v_{iy} + a\Delta t$

A) 5 m/s   B) 2 m/s   C) 50 m/s   D) 125 m/s

13. Which of the following paths has the least displacement?

A) 40 meters north, 12 meters east, 30 meters south, and 15 meters west
B) 3 meters south east
C) 3 meters north, 4 meters east, and 5 meters 37 degrees south of west
D) 5 meters west 4 meters east   1m
E) 16 meters north 2 meters south east

3-4-5 triangle
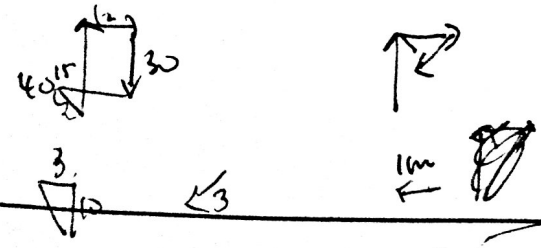
14. A baseball player throws a ball horizontally. Which statement best describes the ball's motion after it is thrown? [Neglect the effect of friction.]

A) Its vertical speed increases, and its horizontal speed increases.
B) Its vertical speed remains the same, and its horizontal speed increases.
C) Its vertical speed increases and its horizontal speed decreases.
D) Its vertical speed remains the same, and its horizontal speed remains the same.
E) Its vertical speed increases, and its horizontal speed remains the same.

15. Which of the following is **not** true about the path of a canon ball launched horizontally from the earth's surface if air resistance is neglected?

A) The cannonball has a uniform horizontal velocity
B) The vertical velocity of cannonball increases as a function of time
C) The total velocity of the cannonball increases as a function of time
D) The distance the cannonball travels only depends upon the height it is shot from
E) The distance the cannonball travels is dependent on its mass

$\begin{pmatrix} Y & X \\ 3 & 4 \\ -3 & -4 \end{pmatrix}$ $\frac{4}{37}$ 5

16. A boat traveling at 20m/s travels east for 20 seconds, west for 5 seconds, north for 22
    seconds and south for 2 seconds. What is the boats total displacement?

    A) 400 m   B) 200 m   C) 500 m   D) 800 m   E) 300 m

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\begin{array}{ll}
\underline{x} & \underline{y} \\
400m & 440m \\
-100m & -40m \\
\hline
300m & 400m
\end{array}
$$