

Physics Practice Exam 1
Fall 2009

1. An oak tree was planted 22 years ago. How many seconds does this correspond to? (Do not take leap days into account.)

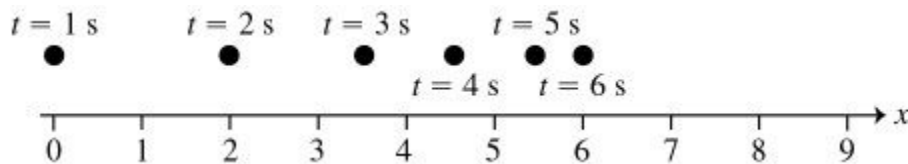
2. A plot of land contains 5.8 acres. How many square meters does it contain?
[1 acre = 43,560 ft²; 1 ft = 0.3048 m].

3. What is $\frac{0.674}{0.74}$ to the proper number of significant figures?

4. If successive images of an object in a motion diagram get closer and closer together, then that object is accelerating or decelerating.

TRUE FALSE

5. The figure below shows the position of a particle (moving along a straight line) as a function of time. Which of the following statements is true?



- A) The object is moving at a constant velocity.
- B) The object is accelerating (speeding up).
- C) The object is decelerating (slowing down).

6. A car travels 95 km to the north at 70.0 km/h, then turns around and travels 21.9 km at 80.0 km/h. What is the difference between the average speed and the average velocity on this trip?

7. The position of an object is given by $x = bt^2 - ct$, where $b = 2.0 \text{ m/s}^2$ and $c = 6.7 \text{ m/s}$. What is the instantaneous velocity of the object when $t = 2.2$?

8. A package is dropped from a helicopter moving upward at 15 m/s . If it takes 16.0 s before the package strikes the ground, how high above the ground was the package when it was released?

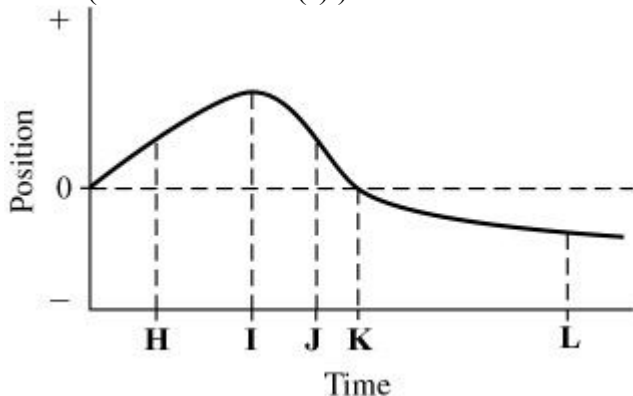
9. If the "velocity versus time" graph of an object is a horizontal line, that object cannot be accelerating.

TRUE FALSE

10. A skier begins skiing straight down a hill having a constant slope, starting from rest. If friction is negligible, as the skier goes down the hill, his/her

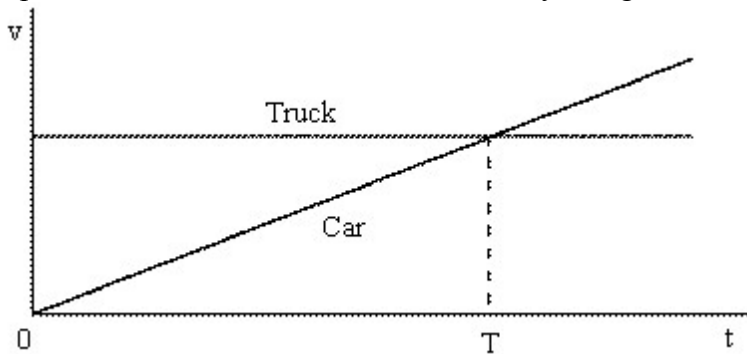
- A) acceleration is constant, with a value less than 9.8 m/s^2 .
- B) acceleration is constant, with a value of roughly 9.8 m/s^2 .
- C) acceleration increases with time.
- D) acceleration is zero.

11. The plot below shows the position of an object as a function of time. The letters H-L represent particular moments of time. At which moment in time is the speed of the object equal to zero? (Circle the letter(s).)



12. A ball is thrown vertically upward and then comes back down. During the ball's flight up and down, its velocity and acceleration vectors are . . .
- A) always in opposite directions.
 - B) always in the same direction.
 - C) first in opposite directions and then in the same direction.
 - D) first in the same direction and then in opposite directions.

12. The motions of a car and a truck along a straight road are represented by the velocity-time graphs below. The two vehicles are initially alongside each other at time $t = 0$.



At time T , what is true of the distances travelled by the vehicles since time $t = 0$?

- A) They will have travelled the same distance.
- B) The truck will not have moved.
- C) The car will have travelled further than the truck.
- D) The truck will have travelled further than the car.

13. A vector of length 4.0 units is directed 23.0° counter-clockwise from the positive x-axis. Find the x-component of the vector.

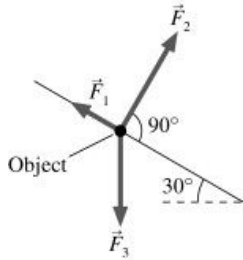
14. Given $\vec{A} = 3\mathbf{i} + 4\mathbf{j}$ and $\vec{B} = 2\mathbf{i} + 2\mathbf{j}$, find the magnitude of $\vec{C} = \vec{A} + 4\vec{B}$.

15. Which of the following is NOT a vector?
- A) acceleration
 - B) speed
 - C) velocity
 - D) displacement

16. A person is standing on an incline having a slope of 20° (with respect to the horizontal direction). The component of the force of gravity (mg) that is parallel to the surface is

- A) $mg \sin(20)$
- B) $mg \cos(20)$
- C) $mg \tan(20)$
- D) $mg \sin(70)$

17. Three forces are exerted on an object placed on a tilted floor. Forces are vectors. The three forces are directed as shown in the figure. Assuming the forces have magnitudes $F_1 = 1 \text{ N}$, $F_2 = 8 \text{ N}$ and $F_3 = 7 \text{ N}$, where N is the standard unit of force, what is the component of the net force, $F_{\text{net}} = F_1 + F_2 + F_3$ parallel to the floor?



18. Draw corresponding graphs for the indicated motion scenarios

