

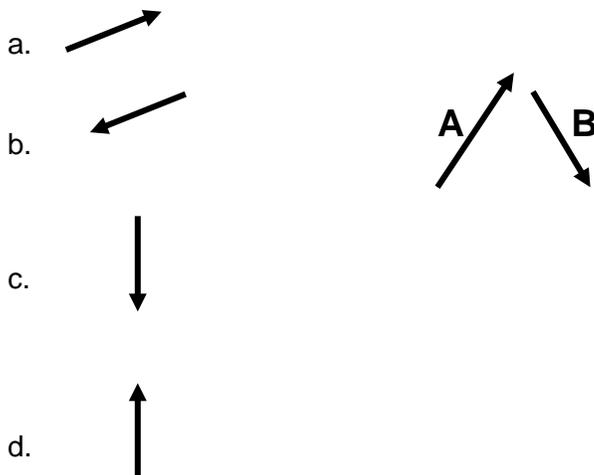
Name _____

Unit 1 Conceptual Questions

Please answer questions on Scantron form 882-ES. Otherwise you will receive a zero. Poorly erased responses will not be re-graded. Turn in two days before unit exam. You are encouraged to work together and discuss these questions!!!

1. Suppose you take your dog for a walk. You walk at 3.0 miles per hour north for 0.5 hours and 4.0 miles per hour west for 0.5 hours. As a result your displacement is
 - A. 2.5 miles 37° North of West
 - B. 5.0 miles 37° North of West
 - C. 2.5 miles 37° West of North
 - D. 5.0 miles 37° West of North
2. Frictional forces always cause objects to slow down. This statement is
 - A. True
 - B. False
3. The normal force is always equal to the weight of an object. This statement is
 - A. True
 - B. False
4. When can a vertical force cancel a horizontal force?
 - A. When an object is weightless.
 - B. When strings support an object.
 - C. When an object is on a frictionless surface.
 - D. Never
5. When an object of mass, m , is suspended by a spring that obeys Hooke's law the amount the spring stretches is
 - A. k/m
 - B. k/mg
 - C. m/k
 - D. mg/k
 - E. impossible to knowwhere k is the spring constant of the spring.
6. With your fast rocket, you go plan a trip to planet X. The trip takes three days. When you arrive on planet X you notice that your weight doubles. This means that
 - A. you better go on a diet.
 - B. the atmospheric pressure on planet X is half that of earth.
 - C. the gravitational force on planet X is twice that of planet Earth.
 - D. the gravitational force on planet X is half that of planet Earth.
 - E. You ate too much during the trip.
7. In physics, there are times where weight can be expressed in kilograms. This statement is
 - A. True
 - B. False
8. Consider your weight and mass on earth and on the moon. Which of the following statements is true regarding your weight and mass on Earth and on the moon?
 - A. Your mass on Earth is equal to your mass on the moon, but your weight on Earth is greater.
 - B. Your mass on Earth is greater than your mass on the moon, but your weight on Earth is equal to your weight on the moon.
 - C. Your mass on Earth is less than your mass on the moon, but your weight on Earth is equal to your weight on the moon.

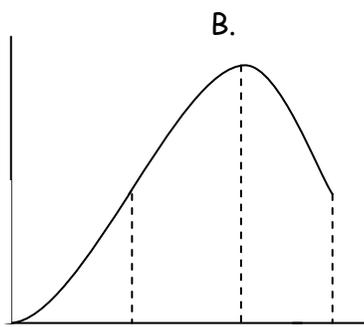
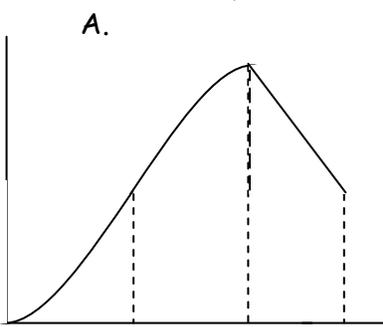
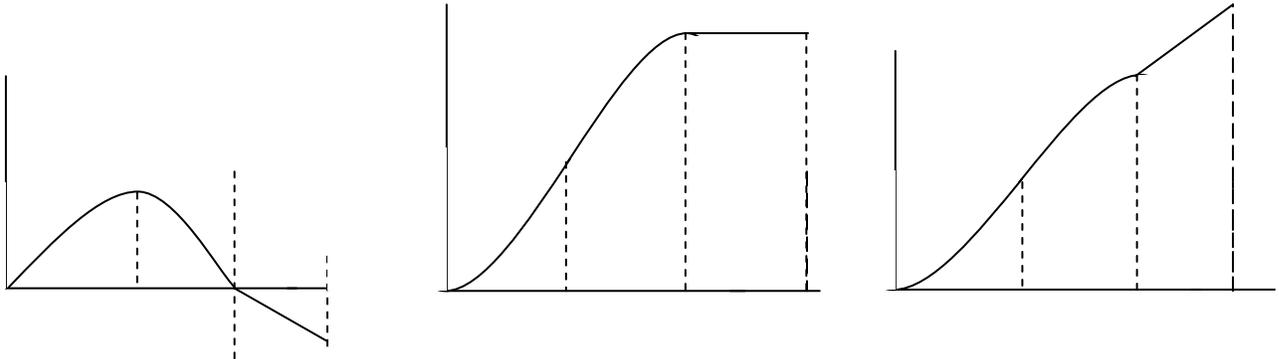
- D. Your mass on Earth is greater than your mass on the moon, and your weight on Earth is less to your weight on the moon.
- E. Your mass on Earth is equal to your mass on the moon, and your weight on Earth is equal to your mass on the moon.
9. You are halfway between the Earth and the moon. Which of the following statements is true regarding your situation?
- A. Your weight has decreased.
- B. Your weight is zero.
- C. Your weight has increased because the gravitational pull of the moon is greater than when you are standing on Earth.
- D. The above choices are nonsense; your weight is the same wherever you are at.
10. One can apply a force of 4N and 14N to counter the action of a single force of
- A. 4N B. 8N C. 13N D. none of the above
11. You tie a rope around a tree and you pull on the rope toward you. Your friend decides to pull on the rope at a point halfway along its length and perpendicular to it. You decide to pull hard on the rope to make it straight. Which of the following is true regarding the rope?
- A. It is possible to make it straight if you pull hard enough on the rope.
- B. It is impossible to make it straight no matter how hard you pull on the rope.
- C. Not enough information is provided to make any reasonable conclusion about the rope.
12. Two displacement vectors of magnitudes 40 cm and 70 cm are added. Which one of the following is the only possible choice for the magnitude of the resultant?
- A. 0 cm B. 28 cm C. 82 cm D. 114 cm
13. A vector of 10 units is directed east. Which of the following vectors when added to aforementioned vector can yield the zero vector?
- A. 10 units south
- B. 10 units east
- C. 10 units west
- D. both A and C
- E. both A, B, and C
14. Which of the following best represents the resultant vector for **B-A**?



15. Your car can accelerate from 5 m/s to 45 m/s in 2 seconds. The acceleration of the car in g's is (use 10 m/s^2 for acceleration of gravity g)
- A. 1 B. 2 C. 64 D. 32
16. A ball is thrown straight upward. When it has reached the highest point in its motion, and is momentarily stopped, its acceleration is
- A. 1 g down B. 1 g up C. zero D. answer depends on weight of ball
17. George drives from town A to town B and back to town A in 2 hours. The distance between town A and town B is 60 miles. What is the average velocity for the entire trip?
- A. 0 mph B. 30 mph C. 60mph D. 120mph
18. George drives from town A to town B and back to town A in 2 hours. The distance between town A and town B is 60 miles. What is the average speed for the entire trip?
- A. 0 mph B. 30 mph C. 60mph D. 120mph
19. George drives from town A to town B at 54mph. However, he drives back to town A at 27mph, due to traffic. What is his average speed for the entire trip (refer to class notes)?
- A. 36mph B. 45mph C. 50mph d. 54mph e. 60mph
20. Which one of the following is not a vector quantity?
- A. average speed
 B. acceleration
 C. displacement
 D. average velocity
 E. instantaneous velocity
21. An object moves with velocity in +x-direction with constant acceleration **a**. After 3 seconds, its acceleration changes to a constant value **-a**. Which of the following statements is true regarding the motion of the object upon this sudden change in acceleration?
- A. Its velocity and displacement become negative.
 B. Its position increases, but its velocity decreases.
 C. Its velocity is positive but its displacement is negative.
 D. Its position and velocity decrease.
 E. Its position and velocity increase
22. Which one of the following statements is an accurate statement about an object moving in one dimension?
- A. If velocity and acceleration have opposite signs, the object is slowing down.
 B. If position and velocity have opposite signs, the object is slowing down.
 C. If an object is not moving, it must have zero acceleration at that instant.
 D. It is not possible for an object to have both negative velocity and negative acceleration.
23. If the speed of an object is constant, its acceleration must be zero. This statement is
- A. true
 B. false
24. A position versus time graph of an object that is speeding up will
- A. be linear with its slope denoting its speed at any time
 B. be curved downward.
 C. be curved upward.
 D. be a horizontal line.

25. Which one of the following situations is *impossible*?
- A. An object has velocity directed east and acceleration directed east.
 - B. An object has zero velocity but non-zero acceleration.
 - C. An object has constant acceleration and changing velocity.
 - D. An object has constant velocity and changing acceleration.
 - E. An object has velocity directed east and acceleration directed west
26. If an object moves at constant velocity, which of the following can increase with time?
- A. average velocity
 - B. instantaneous velocity
 - C. displacement
 - D. direction
 - E. acceleration
27. The maximum speed of a particle is v_0 . If the particle travels at half its maximum speed for a half hour, one-third its maximum speed for one-third of an hour, five-eighths of its maximum speed for four-fifths of an hour, calculate its average speed during the trip.
- a. $(0.43)v_0$
 - b. $(0.53)v_0$
 - c. $(0.63)v_0$
 - d. $(0.73)v_0$
 - e. $(0.83)v_0$
28. An object is thrown upward and reaches a height h . If the initial speed is doubled, the maximum height
- a. increases by a factor of 2.
 - b. decreases by a factor of 2.
 - c. increases by a factor of $\sqrt{2}$.
 - d. decreases by a factor of $\sqrt{2}$.
 - e. increases by a factor of 4.

29. Starting from rest, an object moves with acceleration $a=b \text{ m/s}^2$ from $t=0$ to $t=3.0\text{s}$, $a=-b \text{ m/s}^2$ from $t=3.0\text{s}$ to $t=6.0\text{s}$, and maintains its speed from $t=6.0\text{s}$ to $t=8.0\text{s}$. Which of these graphs best represents the position vs. time graph of the object in the time interval $t=0.0\text{s}$ to $t=8.0\text{s}$?



D.

E.

30. What is the displacement of the object from $t=3.0\text{s}$ to $t=6.0\text{s}$, if $b=3$?

- a. -54m
- b. -18m
- c. 0
- d. 13.5m
- e. 27m