

Webreview 2.2 - Linear Motion Practice Test**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- _____ 1. The position of a particle as it moves along the x axis is given for $t > 0$ by $x = (t^3 - 3t^2 + 6t)$ m, where t is in s. Where is the particle when it achieves its minimum speed (after $t = 0$)?
- 3 m
 - 4 m
 - 8 m
 - 2 m
 - 7 m
- _____ 2. A particle moving with a constant acceleration has a velocity of 20 cm/s when its position is $x = 10$ cm. Its position 7.0 s later is $x = -30$ cm. What is the acceleration of the particle?
- -7.3 cm/s^2
 - -8.9 cm/s^2
 - -11 cm/s^2
 - -15 cm/s^2
 - -13 cm/s^2
- _____ 3. In 2.0 s, a particle moving with constant acceleration along the x axis goes from $x = 10$ m to $x = 50$ m. The velocity at the end of this time interval is 10 m/s. What is the acceleration of the particle?
- $+15 \text{ m/s}^2$
 - $+20 \text{ m/s}^2$
 - -20 m/s^2
 - -10 m/s^2
 - -15 m/s^2
- _____ 4. An object moving on the x axis with a constant acceleration increases its x coordinate by 80 m in a time of 5.0 s and has a velocity of +20 m/s at the end of this time. Determine the acceleration of the object during this motion.
- -1.6 m/s^2
 - $+6.4 \text{ m/s}^2$
 - $+1.6 \text{ m/s}^2$
 - -2.0 m/s^2
 - -6.4 m/s^2
- _____ 5. A ball is thrown vertically upward with an initial speed of 20 m/s. Two seconds later, a stone is thrown vertically (from the same initial height as the ball) with an initial speed of 24 m/s. At what height above the release point will the ball and stone pass each other?
- 17 m
 - 21 m
 - 18 m
 - 27 m
 - 31 m

- _____ 6. A stone is thrown from the top of a building with an initial velocity of 20 m/s downward. The top of the building is 60 m above the ground. How much time elapses between the instant of release and the instant of impact with the ground?
- 2.0 s
 - 6.1 s
 - 3.5 s
 - 1.6 s
 - 1.0 s

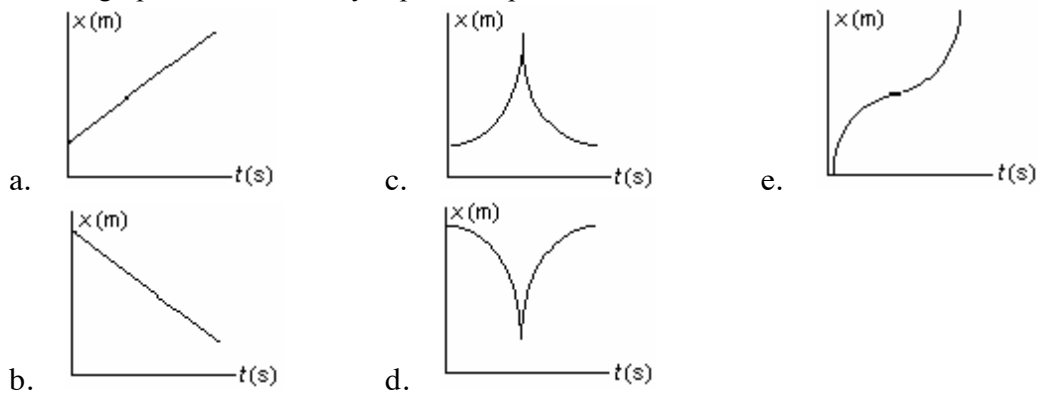
- _____ 7. The velocity at the midway point of a ball able to reach a height y when thrown with velocity v_i at the origin is:
- $\frac{v_i}{2}$
 - $\sqrt{v_i^2 + 2gy}$
 - $\sqrt{\frac{v_i^2}{2}}$
 - $\sqrt{v_i^2 + 2gy}$
 - gy

- _____ 8. A particle moving along the x axis has a position given by $x = 54t - 2.0t^3$ m. At the time $t = 3.0$ s, the speed of the particle is zero. Which statement is correct?
- The particle remains at rest after $t = 3.0$ s.
 - The particle no longer accelerates after $t = 3.0$ s.
 - The particle can be found at positions $x < 0$ m only when $t < 0$ s.
 - All of the above are correct.
 - None of the above is correct.

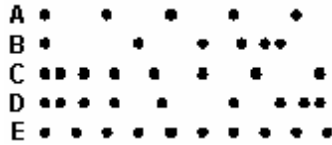
- _____ 9. The position of an object at equal time intervals is shown below:



Which graph below correctly represents position versus time for this object?



_____ 10. Five motion diagrams in which points represent the positions of an object at equal time intervals are shown below. Which statement is correct?



- a. A has the greatest speed and the greatest acceleration.
- b. C has decreasing speed.
- c. D slows down and then speeds up.
- d. D speeds up and then slows down.
- e. E has a greater speed than A.

_____ 11. The equation that solves a problem is $\left(18 \frac{\text{m}}{\text{s}}\right)^2 - \left(0 \frac{\text{m}}{\text{s}}\right)^2 = 2\left(3.0 \frac{\text{m}}{\text{s}^2}\right)(3.0 \text{ m})$. The problem is:

- a. What is the initial velocity of a car that goes from rest to 18 m/s in 3.0 s?
- b. What is the final velocity of a car that goes from rest to 18 m/s in 3.0 s?
- c. What is the initial velocity of a car that accelerates at 18 m/s for 3.0 s?
- d. What is the final velocity of a car that accelerates at 3.0 m/s² over a 6.0 m distance?
- e. What is the final velocity of a car that accelerates at 3.0 m/s² over a 3.0 m distance?

_____ 12. The area under a graph of v_x vs. t from $t = t_i$ to $t = t_f$ represents

- a. x_i .
- b. x_f .
- c. $x_f - x_i$.
- d. $\frac{1}{2}(x_i + x_f)$.
- e. $x_i + x_f$.

_____ 13. Cart A, of mass m , starts from rest and travels in a straight line with acceleration a . It traverses a distance x in time t . Cart B, of mass $4m$, starts from rest and travels in a straight line with acceleration $\frac{a}{2}$. At time t it has traversed the distance

- a. $\frac{x}{4}$.
- b. $\frac{x}{2}$.
- c. x .
- d. $2x$.
- e. $4x$.

**Webreview 2.2 - Linear Motion Practice Test
Answer Section**

MULTIPLE CHOICE

1. B
2. A
3. D
4. C
5. A
6. A
7. C
8. E
9. E
10. D
11. E
12. C
13. B