

Chapter 4 review

4.1 Conceptual Questions

- _____ 1) Two displacement vectors have magnitudes of 5.0 m and 7.0 m, respectively. If these two vectors are added together, the magnitude of the sum
A) is equal to 2.0 m. B) could be as small as 2.0 m or as large as 12 m. C) is equal to 12 m.
D) is equal to 8.6 m.
- _____ 2) The magnitude of the resultant of two vectors cannot be less than the magnitude of either of those two vectors.
A) True B) False
- _____ 3) The sum of two vectors of fixed magnitudes has the greatest magnitude when the angle between these two vectors is
A) 90° B) 180° C) 60° D) 0° E) 270°
- _____ 4) The eastward component of vector \vec{A} is equal to the westward component of vector \vec{B} and their northward components are equal. Which one of the following statements must be correct for these two vectors?
A) Vector \vec{A} is parallel to vector \vec{B} . B) Vector \vec{A} is antiparallel (in the opposite direction) to vector \vec{B} . C) Vector \vec{A} must be perpendicular to vector \vec{B} . D) The magnitude of vector \vec{A} must be equal to the magnitude of vector \vec{B} . E) The angle between vector \vec{A} and vector \vec{B} must be 90° .
- _____ 5) For general projectile motion with no air resistance, the horizontal component of a projectile's velocity
A) remains zero. B) remains a non-zero constant. C) continuously increases. D) continuously decreases. E) first decreases and then increases.
- _____ 6) For general projectile motion with no air resistance, the horizontal component of a projectile's acceleration
A) is always zero. B) remains a non-zero constant. C) continuously increases. D) continuously decreases. E) first decreases and then increases.
- _____ 7) Which of the following statements are true about an object in two-dimensional projectile motion with no air resistance? (There could be more than one correct choice.)
A) The speed of the object is constant but its velocity is not constant. B) The acceleration of the object is $+g$ when the object is rising and $-g$ when it is falling. C) The acceleration of the object is zero at its highest point. D) The speed of the object is zero at its highest point. E) The horizontal acceleration is always zero and the vertical acceleration is always a non-zero constant downward.

- 8) In an air-free chamber, a pebble is thrown horizontally, and at the same instant a second pebble is dropped from the same height. Compare the times of fall of the two pebbles.
 A) The thrown pebble hits first. B) The dropped pebble hits first. C) They hit at the same time.
 D) We cannot tell without knowing which pebble is heavier.
- 9) James and John dive from an overhang into the lake below. James simply drops straight down from the edge. John takes a running start and jumps with an initial horizontal velocity of 25 m/s. Compare the time it takes each to reach the lake below if there is no air resistance.
 A) James reaches the surface of the lake first. B) John reaches the surface of the lake first.
 C) James and John will reach the surface of the lake at the same time. D) Cannot be determined without knowing the mass of both James and John. E) Cannot be determined without knowing the weight of both James and John.

4.2 Problems

- 10) A boy jumps with a velocity of magnitude 20.0 m/s at an angle of 25.0° above the horizontal. What is the horizontal component of the boy's velocity?
 A) 18.1 m/s B) 15.6 m/s C) 8.45 m/s D) 12.6 m/s E) 9.33 m/s

P II

- An airplane heads due North at an air speed of 35 m/s. The wind is from the East at 8.0 m/s. Find the magnitude of the resultant velocity.
- A man pushes a broom with a force of 12 pounds. The broom handle makes an angle of 25 degrees with the horizontal. Find the magnitude of the horizontal and vertical components of his force.

P II

1. 35.9 m/s

2. $\text{Hor} = 12 \text{ Lb} \cos 25^\circ = 10.9 \text{ Lb}$

$\text{Vert} = 12 \text{ Lb} \sin 25^\circ = 5.07 \text{ Lb}$

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Answer Section

- ANS: B
- ANS: B
- ANS: D
- ANS: D
- ANS: B
- ANS: A
- ANS: E
- ANS: C
- ANS: C
- ANS: A