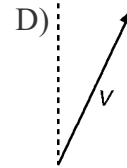
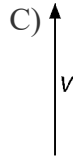
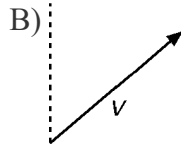
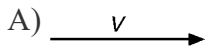
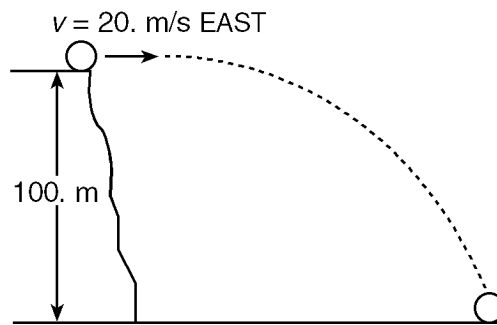


- 1) A ball is fired vertically upward at 5.0 meters per second from a cart moving horizontally to the right at 2.0 meters per second. Which vector *best* represents the resultant velocity of the ball when fired?



Questions 2 and 3 refer to the following:

The diagram below shows a ball projected horizontally with an initial velocity of 20. meters per second east, off a cliff 100. meters high. [Neglect air resistance.]



- 2) During the flight of the ball, what is the direction of its acceleration?
- A) downward B) upward C) westward D) eastward
- 3) How many seconds does the ball take to reach the ground?
- A) 2.0 s B) 20. s C) 9.8 s D) 4.5 s

Questions 4 through 6 refer to the following:

A cannon elevated at an angle of 35° to the horizontal fires a cannonball, which travels the path shown in the diagram below. [Neglect air resistance and assume the ball lands at the same height above the ground from which it was launched.]



- 4) If the angle of elevation of the cannon is decreased from 35° to 30° , the vertical component of the ball's initial velocity will
- A) increase and its horizontal component will increase
 B) increase and its horizontal component will decrease
 C) decrease and its horizontal component will increase
 D) decrease and its horizontal component will decrease

- 5) If the ball lands 7.0×10^2 meters from the cannon 10. seconds after it was fired, what is the horizontal component of its initial velocity?
- A) 70. m/s B) 49 m/s C) 7.0 m/s D) 35 m/s
- 6) If the ball's time of flight is 10. seconds, what is the vertical component of its initial velocity?
- A) 70. m/s B) 49 m/s C) 9.8 m/s D) 98 m/s
- 7) A projectile is launched at an angle of 60° above the horizontal. Compared to the vertical component of the initial velocity of the projectile, the vertical component of the projectile's velocity when it has reached its maximum height is
- A) the same C) greater
B) less
- 8) A projectile is fired a velocity of 150. meters per second at an angle of 30° with the horizontal. What is the magnitude of the vertical component of the velocity at the time the projectile is fired?
- A) 225 m/s B) 150. m/s C) 75.0 m/s D) 130. m/s
- 9) A bullet is fired from a rifle with a muzzle velocity of 100. meters per second at an angle of $30.^\circ$ up from the horizontal. What is the magnitude of the vertical component of the muzzle velocity?
- A) 100 m/s B) 50. m/s C) 87 m/s D) 0.0 m/s
- 10) A projectile is launched at an angle of $60.^\circ$ to the horizontal at an initial speed of 10. meters per second. What is the magnitude of the vertical component of its initial speed?
- A) 2.5 m/s B) 5.0 m/s C) 8.7 m/s D) 4.3 m/s
- 11) A batted softball leaves the bat with an initial velocity of 44 meters per second at an angle of 37° above the horizontal. What is the magnitude of the initial vertical component of the softball's velocity?
- A) 0 m/s B) 35 m/s C) 44 m/s D) 26 m/s
- 12) A cannon with a muzzle velocity of 500. meters per second fires a cannonball at an angle of $30.^\circ$ above the horizontal. What is the vertical component of the cannonball's velocity as it leaves the cannon?
- A) 500. m/s B) 250. m/s C) 0.0 m/s D) 433 m/s