Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Web review - Ch 3 motion in two dimensions practice test

Multiple Choice

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

____ 1. Which type of quantity is characterized by both magnitude and direction?
a. scalar
b. vector
c. trigonometric
d. algebraic variable
e. dimensional

____ 2. Which of the following is an example of a vector quantity?
a. velocity
b. temperature
c. volume
d. mass
e. length

____ 3. A student adds two vectors with magnitudes of 200 and 40. Which one of the following is the only possible choice for the magnitude of the resultant?
a. 100
b. 200
c. 260
d. 40
e. 150

____ 4. Vector $\vec{\mathbf{A}}$ points north and vector $\vec{\mathbf{B}}$ points east. If $\vec{\mathbf{C}} = \vec{\mathbf{B}} - \vec{\mathbf{A}}$, then vector $\vec{\mathbf{C}}$ points:

a. north of east.
b. south of east.
c. north of west.
d. south of west.
e. No conclusion can be made with the information given.

____ 5. A stone is thrown at an angle of 30° above the horizontal from the top edge of a cliff with an initial speed of 12 m/s. A stop watch measures the stone's trajectory time from top of cliff to bottom to be 5.6 s. What is the height of the cliff? (g = 9.8 m/s^2 and air resistance is negligible)
a. 58 m
b. 154 m
c. 120 m
d. 197 m
e. 213 m

____ 6. A stone is thrown with an initial speed of 15 m/s at an angle of 53° above the horizontal from the top of a 35 m building. If g = 9.8 m/s^2 and air resistance is negligible, then what is the magnitude of the vertical velocity component of the rock as it hits the ground?
a. 9.0 m/s
b. 18 m/s
c. 26 m/s
d. 29 m/s
e. 32 m/s

____ 7. A stone is thrown with an initial speed of 15 m/s at an angle of 53° above the horizontal from the top of a 35 m building. If $g = 9.8$ m/s^2 and air resistance is negligible, then what is the speed of the rock as it hits the ground?
   a. 15 m/s
   b. 21 m/s
   c. 30 m/s
   d. 36 m/s
   e. 42 m/s

____ 8. A bridge that was 5.0 m long has been washed out by the rain several days ago. How fast must a car be going to successfully jump the stream? Although the road is level on both sides of the bridge, the road on the far side is 2.0 m lower than the road on this side.
   a. 5.0 m/s
   b. 7.8 m/s
   c. 13 m/s
   d. 25 m/s
   e. 27 m/s

____ 9. Arvin the Ant is on a picnic table. He travels 30 cm eastward, then 25 cm northward, and finally 15 cm westward. What is the magnitude of Arvin's net displacement?
   a. 70 cm
   b. 57 cm
   c. 52 cm
   d. 29 cm
   e. 18 cm

____ 10. Arvin the Ant travels 30 cm eastward, then 25 cm northward, and finally 15 cm westward. What is Arvin's direction of displacement with respect to his original position?
   a. 59° N of E
   b. 29° N of E
   c. 29° N of W
   d. 77° N of E
   e. 15° N of W

____ 11. A runner circles a track of radius 100 m in 100 s moving at a constant rate. If the runner was initially moving north, what has been the runner's average acceleration when halfway around the track?
   a. At a constant rate, the average acceleration would be zero.
   b. 2 m/s^2, west
   c. 0.25 m/s^2, south
   d. 1.5 m/s^2, east
   e. No answer is correct.

____ 12. A baseball thrown from the outfield is released from shoulder height at an initial velocity of 29.4 m/s at an initial angle of 30.0° with respect to the horizontal. If it is in its trajectory for a total of 3.00 s before being caught by the third baseman at an equal shoulder-height level, what is the ball's net vertical displacement during its 3-s trajectory?
   a. 11.0 m
   b. 9.80 m
   c. 22.1 m
   d. zero
   e. 44.1 m

____ 13. A ball is rolled horizontally off a table with an initial speed of 0.24 m/s. A stopwatch measures the ball's trajectory time from table to the floor to be 0.30 s. What is the height of the table? (g = 9.8 m/s^2 and air resistance is negligible)
a. 0.11 m
b. 0.22 m
c. 0.33 m
d. 0.44 m
e. 0.55 m

____ 14. A ball is rolled horizontally off a table with an initial speed of 0.24 m/s. A stop watch measures the ball's trajectory time from table to the floor to be 0.30 s. How far away from the table does the ball land? (g = 9.8 m/s^2 and air resistance is negligible)
a. 0.055 m
b. 0.072 m
c. 1.2 m
d. 1.9 m
e. 2.5 m

____ 15. A stone is thrown at an angle of 30° above the horizontal from the top edge of a cliff with an initial speed of 12 m/s. A stop watch measures the stone's trajectory time from top of cliff to bottom to be 5.6 s. How far out from the cliff's edge does the stone travel horizontally? (g = 9.8 m/s^2 and air resistance is negligible)
a. 58 m
b. 154 m
c. 120 m
d. 175 m
e. 197 m

____ 16. A rifle is aimed horizontally toward the center of a target 100 m away. If the bullet strikes 10 cm below the center, what was the velocity of the bullet? (Ignore air friction.)
a. 300 m/s
b. 333 m/s
c. 500 m/s
d. 700 m/s
e. 751 m/s

____ 17. A quarterback takes the ball from the line of scrimmage, runs backward for 10 yards, then sideways parallel to the line of scrimmage for 15 yards. He then throws a 50-yard forward pass straight downfield perpendicular to the line of scrimmage. The receiver is tackled immediately. How far is the football displaced from its original position?
a. 43 yards
b. 55 yards
c. 63 yards
d. 75 yards
e. 81 yards

____ 18. Superguy is flying at treetop level near Paris when he sees the Eiffel Tower elevator start to fall (the cable snapped). His x-ray vision tells him Lois LaTour is inside. If Superguy is 1.00 km away from the tower, and the elevator falls from a height of 240 m, how long does Superguy have to save Lois, and what must be his average speed?
a. 3.00 s, 333 m/s
b. 5.00 s, 200 m/s
c. 7.00 s, 143 m/s
d. 9.00 s, 111 m/s
e. 10.0 s, 96.0 m/s

____ 19. A baseball leaves the bat with a speed of 44.0 m/s and an angle of 30.0° above the horizontal. A 5.0-m-high fence is located at a horizontal distance of 132 m from the point where the ball is struck. Assuming the ball leaves the bat 1.0 m above ground level, by how much does the ball clear the fence?
a. 4.4 m
b. 8.8 m
c. 13.4 m
d. 17.9 m
e. 18.4 m

____ 20. A fireman, 50.0 m away from a burning building, directs a stream of water from a fire hose at an angle of 30.0° above the horizontal. If the initial speed of the stream is 40.0 m/s, at what height will the stream of water strike the building?
a. 9.60 m
b. 13.4 m
c. 18.7 m
d. 22.4 m
e. 24.3 m

____ 21. Two projectiles are launched at 100 m/s, the angle of elevation for the first being 30° and for the second 60°. Which of the following statements is false?
a. Both projectiles have the same acceleration while in flight.
b. The second projectile has the lower speed at maximum altitude.
c. Both projectiles have the same range.
d. All of the above statements are false.
e. Both projectiles have the same initial speed

____ 22. A boat moves through the water in a river at a speed of 8 m/s relative to the water. The boat makes a trip downstream and then makes a return trip upstream to the original starting place. Which trip takes longer?
a. the downstream trip
b. the upstream trip
c. Both trips take the same amount of time.
d. The answer cannot be figured without knowing the speed of the river flow.

____ 23. Plane A is flying at 400 mph in the northeast direction relative to the earth. Plane B is flying at 500 mph in the north direction relative to the earth. What is the speed of Plane B as observed from Plane A?
a. 900 mph
b. 640 mph
c. 357 mph
d. 100 mph
e. 98.2 mph

____ 24. Plane A is flying at 400 mph in the northeast direction relative to the earth. Plane B is flying at 500 mph in the north direction relative to the earth. What is the direction of motion of Plane B as observed from Plane A?

a. 52.5^{o} N of E
b. 52.5^{o} N of W
c. 37.5^{o} N of W
d. 36.9^{o} N of W
e. 37.5^{o} N of E

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Answer Section

MULTIPLE CHOICE

1. B
2. A
3. B
4. B
5. C
6. D
7. C
8. B
9. D
10. A
11. C
12. D
13. D
14. B
15. A
16. D
17. A
18. C
19. C
20. C
21. D
22. B
23. C
24. C