1. The vector equation that describes the relationship among vectors **A, B** and **C**  is



1. **B**=**C**+**A** b. **B**=**C**-**A** c. **C**=**A**-**B** d. **A**=**B**-**C** e. **A**=**C**+**B**

2. Two vector quantities, whose directions can be altered at will, can have a resultant between the limits 5 and 15. The magnitudes of these two vector quantities could be

a. 2 and 2. b. 5 and 10. c. 20 and 40. d. 20 and 50. e. 59 and 97.

3. Three vectors **A, B,** and C have the following x and y components:

X component

y component

**A B** c

+6 -3 +2

-3 . +4 +5

The magnitude of the resultant of A, B, and C is

a. 3.3 b. 5.0 c. 11 d. 7.8 e. 14

4. Three vectors **A, B,** and **C** have the following x and y components:

**A B C**

X component +6 -3 +2

Y component -3 +4 +5

The angle that the resultant makes with the positive direction of the x axis is

a. 1.2° b. 36° c. 50° d. 40° e. 70°

5. Vector **A** has components Ax= +4.0 units and Ay = +3.2 units, whereas vector **B** has components Bx = +2.5 units and By = +5.5 units. The angle between the two vectors is

a. 24° b. 65° c. 27° d. 39° e. 14°

6.

(1)



(2)

y y

(3)

(4)

A velocity vector has an x component of +5.5 m/s and a y component of -3.5 m/s. The diagram that gives the direction of the vector is

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 1 | b. 2 | c. 3 |
| d. | 4 | e. none of these. |  |

7. A particle has an initial velocity of 4.8 m/s toward the south and a final velocity of 7.1 m/s toward the east. The particle was subject to a constant acceleration for 0.25 s. The magnitude and the direction of the acceleration must have been .

a. 8.6 m/s2 at 34.1° north of east b. 260 m/s2 at 34.1° south of east

c. 34 m/s2 at 34.1o north of east d. 34 m/s2 at 34.1o south of east

e. 8.6 m/s2 at 34.10 south of east

8. Given vector **A**, the vector 3**A**

a. has a magnitude 3 times that of A.

b. points in the same direction as A.

c. has components each of which is 3 times those of **A**

d. makes the same angle with a given axis as does **A**.

e. is described by all of these.

9. A river is 0.76 km wide. The banks are straight and parallel. The current is 5.0 km/h and is parallel to the banks. A boat has a maximum speed of 3 km/h in still water. The pilot of the boat wishes to travel on a straight line from A to B, where AB is perpendicular to the banks. The pilot should

a. head directly across the river.

b. head 68° upstream from the line AB.

c. head 22° upstream from the line AB.

d. give up. The trip from A to B is not possible with this boat.

e. do none of these.

1 0. If an object is moving west, its acceleration

a. is north.

*d.* is south.

b. is east.

e. may be any direction.

c. is west.

11. A car is traveling south at 30 km/h. It rounds a curve, and 6 s later it is traveling west at 30 km/h. The magnitude of the average acceleration of the car is

a. zero b. 60 km/h · s c. 5 km/h · s d. 50 km/h · s e. 7.1 km/h · s

12. A projectile is fired with an initial speed of 1000 m/s at an angle of 37° above the horizontal. If air resistance is neglected, the horizontal component of the projectile's velocity after 20 s is approximately

a. 600 m/s b. 800 m/s c. 640 m/s d. 40 m/s e. 160 m/s

13. Which of the following statements is not true of a projectile moving near the surface of the earth against negligible air resistance?

a. The horizontal velocity is constant.

b. The vertical acceleration is constant.

c. The horizontal displacement is directly proportional to the time of flight

d. The vertical velocity at any given time is independent of the angle of projection.

e. The horizontal acceleration is constant.

14. A projectile is shot at an angle of 45° to the horizontal near the surface of the earth but in the absence of air resistance. When it reaches the highest point of its trajectory, its speed is 150 m/s. In a second trial with the same projectile, the initial speed is the same but the angle is now 37° with the horizontal. At its highest point in this trajectory, the speed of the projectile would be ·

a. 150 m/s (sin 45°/sin 36°)

d. 150 m/s (37/45)

b. 150 m/s (cos 37°/cos 45°) c. 150 m/s (sin 37°/sin 45°)

e. none of these.

15. A rescue airplane is diving at an angle of 37° below the horizontal with a speed of 250 m/s. It releases a survival package when it is at an altitude of 600 m. If air resistance is ignored, the horizontal distance of the point of impact from the plane at the moment of the package's release is

a. 2.80 x 103 m b. 720 m c. 6.80 x 103m d. 420 m e. 5.50 x 103m

16. A projectile was fired at 35° above the horizontal. At the highest point in its trajectory its speed was 200 m/s. If air resistance is ignored, the initial velocity had a horizontal component .of '

|  |  |  |
| --- | --- | --- |
| a. zero | b. 200 cos (35°) m/s | c. 200 sin (35°) m/s |
| d. 200/cos (35°) m/s | e. 200 m/s |  |

17. A projectile is fired horizontally in earth gravity with an initial speed v0. In the absence of air resistance, which of the

 following graphs is representative of the projectile motion?



a. 1 b. 2 c. 3 d. 4 e. 5

18. The figure represents the parabolic trajectory of a ball going from A to E. What is the speed at point C compared with that at point A?



1. It is greater at C than at A
2. It is less at C than at A
3. The speeds are identical
4. The speeds are both zero.
5. It is not possible to answer this question without more information.

19. An object traveling in a circle at constant speed

 a. is moving with constant velocity

 b. may be slowing down or picking up speed.

 c. experiences no acceleration

 d. experiences an acceleration toward the center of the circle

 e. is described by none of the above statements

20. A particle moving with uniform circular motion has a period of 0.24 s and a speed of 4.2m/s.

The radius of the path of the particle is

a. 16 cm b. 2.6 cm c. 1.0 m d. 0.062 cm e. 1.4 cm