

Exemplar Solutions for Class 11 Physics Chapter 4 - Motion In A Plane

Multiple Choice Questions I

1. The angle between $A = \hat{i} + \hat{j}$ and $B = \hat{i} - \hat{j}$ is

- a) 40°
- b) 90°
- c) -45°
- d) 180°

Answer: The correct answer is b) 90°

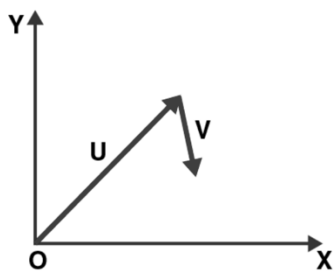
2. Which one of the following statements is true?

- a) a scalar quantity is the one that is conserved in a process
- b) a scalar quantity is the one that can never take negative values
- c) a scalar quantity is the one that does not vary from one point to another in space
- d) a scalar quantity has the same value for observers with different orientations of the axes

Answer: The correct answer is d) a scalar quantity has the same value for observers with different orientations of the axes

3. Figure shows the orientation of two vectors u and v in the XY plane. If $u = a\hat{i} + b\hat{j}$ and $v = p\hat{i} + q\hat{j}$, which of the following is correct?

- a) a and p are positive while b and q are negative
- b) a , p , and b are positive while q is negative
- c) a , q , and b are positive while p is negative
- d) a , b , p , and q are all positive



Answer: The correct answer is b) a, p, and b are positive while q is negative

4. The component of a vector r along X-axis will have maximum value if

- a) r is along positive Y-axis
- b) r is along positive X-axis
- c) r makes an angle of 45° with the X-axis
- d) r is along negative Y-axis

Answer: The correct answer is b) r is along positive X-axis

5. The horizontal range of a projectile fired at an angle of 15° is 50 m. If it is fired with the same speed at an angle of 45° , its range will be

- a) 60 m
- b) 71 m
- c) 100 m
- d) 141 m

Answer: The correct answer is c) 100 m

6. Consider the quantities pressure, power, energy, impulse gravitational potential, electric charge, temperature, area. Out of these, the only vector quantities are

- a) impulse, pressure, and area
- b) impulse and area
- c) area and gravitational potential
- d) impulse and pressure

Answer: The correct answer is b) impulse and area

7. In a two dimensional motion, instantaneous speed v_0 is a positive constant. Then which of the following are necessarily true?

- a) the average velocity is not zero at any time
- b) average acceleration must always vanish
- c) displacements in equal time intervals are equal
- d) equal path lengths are traversed in equal intervals

Answer: The correct answer is d) equal path lengths are traversed in equal intervals

8. In a two dimensional motion, instantaneous speed v_0 is a positive constant. Then which of the following are necessarily true?

- a) the acceleration of the particle is zero
- b) the acceleration of the particle is bounded
- c) the acceleration of the particle is necessarily in the plane of motion
- d) the particle must be undergoing a uniform circular motion

Answer: The correct answer is d) the particle must be undergoing a uniform circular motion

9. Three vectors A , B , and C add up to zero. Find which is false

- a) vector $(A \times B)C$ is not zero unless vectors B , C are parallel
- b) vector $(A \times B) \cdot C$ is not zero unless vectors B , C are parallel
- c) if vectors A , B , C define a plane, $(A \times B)C$ is in that plane
- d) $(A \times B) \cdot C = |A| |B| |C|$ such that $C^2 = A^2 + B^2$

Answer: The correct answer is c) if vectors A , B , C define a plane, $(A \times B)C$ is in that plane and d) $(A \times B) \cdot C = |A| |B| |C|$ such that $C^2 = A^2 + B^2$

10. It is found that $|A + B| = |A|$. This necessarily implies

- a) $B = 0$
- b) A , B are antiparallel
- c) A , B are perpendicular

d) $A \cdot B \leq 0$

Answer: The correct answer is a) $B = 0$

Multiple Choice Questions II

11. Two particles are projected in air with speed v_0 , at angles θ_1 and θ_2 to the horizontal, respectively. If the height reached by the first particle is greater than that of the second, then tick the right choices

a) angle of project: $\theta_1 > \theta_2$

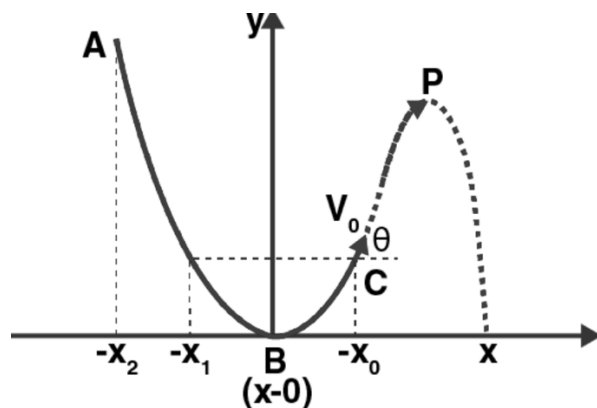
b) time of flight: $T_1 > T_2$

c) horizontal range: $R_1 > R_2$

d) total energy: $U_1 > U_2$

Answer: The correct answer is a) angle of project: $\theta_1 > \theta_2$ and b) time of flight: $T_1 > T_2$

12. A particle slides down a frictionless parabolic track starting from rest at point A. Point B is at the vertex of parabola and point C is at a height less than that of point A. After C, the particle moves freely in air as a projectile. If the particle reaches highest point at P, then



a) KE at P = KE at B

b) height at P = height at A

c) total energy at P = total energy at A

d) time of travel from A to B = time of travel from B to P

Answer: The correct answer is c) total energy at P = total energy at A

13. Following are four different relations about displacement, velocity, and acceleration for the motion of a particle in general. Choose the incorrect one(s):

a) $\bar{v}_{av} = \frac{1}{2}[v(t_1) + v(t_2)]$

b) $\bar{v}_{av} = [r(t_2) - r(t_1)]/[t_2 - t_1]$

c) $r = \frac{1}{2}[v(t_2) - v(t_1)](t_2 - t_1)$

d) $\bar{a}_{av} = [v(t_2) - v(t_1)]/[t_2 - t_1]$

Answer: The correct answer is a) $\bar{v}_{av} = \frac{1}{2}[v(t_1) + v(t_2)]$ and c) $r = \frac{1}{2}[v(t_2) - v(t_1)](t_2 - t_1)$

14. For a particle performing uniform circular motion, choose the correct statement from the following:

a) magnitude of particle velocity (speed) remains constant

b) particle velocity remains directed perpendicular to radius vector

c) direction of acceleration keeps changing as particle moves

d) angular momentum is constant in magnitude but direction keep changing

Answer: The correct answer is a) magnitude of particle velocity (speed) remains constant, b) particle velocity remains directed perpendicular to radius vector and c) direction of acceleration keeps changing as particle moves

15. For two vectors A and B, $|A + B| = |A - B|$ is always true when

a) $|A| = |B| \neq 0$

b) $A \perp B$

c) $|A| = |B| \neq 0$ and A and B are parallel or antiparallel

d) when either $|A|$ or $|B|$ is zero

Answer: The correct answer is b) $A \perp B$ and d) when either $|A|$ or $|B|$ is zero