CBSE 11th PHYSICS
MOTION IN A PLANE

OBJECTIVE TYPE OF QUESTIONS (1 MARK):

1) Position of a particle in a rectangular-co-ordinate system is (3, 2, 5). Then its position vector will be
   a) $3\hat{\imath} + 5\hat{\jmath} + 2\hat{k}$
   b) $3\hat{\imath} + 2\hat{\jmath} + 5\hat{k}$
   c) $5\hat{\imath} + 3\hat{\jmath} + 2\hat{k}$
   d) None of these

2) If a particle moves from point P (2,3,5) to point Q (3,4,5). Its displacement vector be
   a) $\hat{\imath} + \hat{\jmath} + 10\hat{k}$
   b) $\hat{\imath} + \hat{\jmath} + 5\hat{k}$
   c) $\hat{\imath} + \hat{\jmath}$
   d) $2\hat{\imath} + 4\hat{\jmath} + 6\hat{k}$

3) The expression $\frac{1}{\sqrt{2}}\hat{\imath} + \frac{1}{\sqrt{2}}\hat{\jmath}$ is a
   a) Unit vector
   b) Null vector
   c) A vector of magnitude √2
   d) Scalar

4) If for two vectors $\vec{A}$ and $\vec{B}$, $\vec{A} \times \vec{B}$ = 0, the vectors
   a) Are perpendicular to each other
   b) Are parallel to each other
   c) Act at an angle of 60°
   d) Act at an angle of 30°

5) A river is flowing from east to west at a speed of 5 m/min. A man on south bank of river, capable of swimming 10m/min in still water, wants to swim across the river in shortest time. He should swim
   a) Due north
   b) Due north east
   c) Due north east with double the speed of river
   d) None of these

6) A body is moving in a circular path with a constant speed. It has
   a) A constant velocity
   b) A constant acceleration
   c) An acceleration of constant magnitude
   d) An acceleration which varies with time

7) A particle moves with constant speed but in constantly varying direction. The path of particle will be
   a) Elliptical
   b) Linear
   c) Circular
   d) parabolic

8) A body travels along the circumference of a circle of radius 2 m with a linear velocity of 6 m/s. Then its angular velocity is
   a) 6 rad/s
   b) 3 rad/s
   c) 2 rad/s
   d) 4 rad/s

9) A stone tied to a string is rotated in a circle. If the string is cut, the stone flies away from the circle because
   a) A centrifugal force acts on the stone
   b) A centripetal force acts on the stone
   c) Of its inertia
   d) Reaction of the centripetal force

10) If A . B = AB, then .... is the angle between A and B.
    a) 0°
    b) 30°
    c) 60°
    d) 90°

VERY SHORT ANSWER TYPE OF QUESTIONS: (2 MARK)

11) Is uniform circular motion a case of uniform motion? Why?

12) What is the angular velocity of the hour hand of a clock?

13) Show that when the horizontal range is maximum, height attained by the body is one fourth the maximum range in the projectile motion.

SHORT ANSWER TYPE OF QUESTIONS (3 MARK):

14) Derive an expression for the time of flight and horizontal range of a projectile when launched at an angle θ with the horizontal.

15) Two forces 5 kgwt and 10 kgwt are acting with an inclination of 120° between them. What is the angle which the resultant makes with 10 kgwt?

16) Two bodies are projected at an angle Θ and (π/2 - Θ) to the horizontal with the same speed. Find the ratio of their time of flight.

LONG ANSWER TYPE OF QUESTIONS (5 MARK):

17) A ball is thrown with an initial velocity of 20 m/s at an angle of 30 degrees above the horizontal. Calculate:
a) The time taken for the ball to reach its maximum height.
b) The maximum height reached by the ball.
c) The horizontal range of the ball.

18) A cannonball is fired from a cannon at ground level. The cannonball follows a parabolic trajectory and hits a target located 500 meters away horizontally. The initial speed of the cannonball is 100 m/s. Determine:
a) The angle at which the cannonball was launched.
b) The maximum height reached by the cannonball.
c) The time taken for the cannonball to reach the target.
d) The velocity of the cannonball just before hitting the target.