1. Which of the following quantities is a vector?
   A. Temperature B. Speed
   C. Displacement D. Mass (C)

Explanation : Displacement has both magnitude and direction, making it a vector quantity.

2. The vector sum of two vectors A and B is zero only when :
   A. A = B B. A = −B
   C. A ⊥ B
   D. A and B are unequal in magnitude (B)

Explanation : The sum of a vector and its negative (same magnitude, opposite direction) results in a zero vector.

3. If a vector A is multiplied by a negative scalar λ, the resulting vector will:
   A. Have the same direction as A
   B. Have opposite direction and reduced magnitude
   C. Have opposite direction and λ times the magnitude of A
   D. Be a null vector (C)

Explanation : Multiplying a vector by a negative scalar reverses its direction and scales the magnitude.

4. A vector A = 3i + 4j. What is the magnitude of A?
   A. 7 B. 5
   C. $\sqrt{13}$ D. 25 (B)

Explanation : Magnitude = $\sqrt{(3^2 + 4^2)} = \sqrt{(9 + 16)} = \sqrt{25} = 5$.

5. The path of a projectile, neglecting air resistance, is a :
   A. Straight line B. Parabola
   C. Circle D. Ellipse (B)

Explanation : The trajectory of a projectile under uniform gravity and no air resistance is a parabola.

6. In uniform circular motion, the direction of the acceleration is always :
   A. Tangent to the path B. Along the velocity
   C. Away from the center
   D. Towards the center (D)

Explanation : In uniform circular motion, acceleration (centripetal) always points towards the center of the circle.

7. The time taken by a projectile to reach the maximum height is :
   A. $v_0\cos\theta/g$ B. $v_0\sin\theta/g$
   C. $2v_0\cos\theta/g$ D. $2v_0\sin\theta/g$ (B)

Explanation : Time to maximum height is when vertical velocity becomes zero, $t = v_0\sin\theta/g$.

8. The range of a projectile is maximum when the angle of projection is :
   A. 0° B. 30°
   C. 45° D. 90° (C)

Explanation : Range is maximum when $\sin(2\theta)$ is maximum, i.e., when $2\theta = 90°$, so $\theta = 45°$.

9. What is the unit vector along the x-axis?
   A. $\hat{j}$ B. $\hat{i}$
   C. $\hat{k}$ D. $-\hat{i}$ (B)

Explanation : The unit vector along the x-axis is denoted by $\hat{i}$.

10. If a particle moves along a path and returns to its starting point, the displacement is:
    A. Equal to path length
    B. Greater than path length
    C. Less than path length D. Zero (D)

Explanation : Displacement is the straight-line distance between initial and final positions. If both are the same, displacement is zero.