1. Two bodies of masses m1 and m2 are connected. If no external force acts on the system, what happens to the velocity of the centre of mass?
A. It decreases gradually
B. It increases gradually
C. It remains constant
D. It becomes zero (C)

Explanation : When the net external force on a system is zero, the velocity of the centre of mass remains unchanged (law of conservation of momentum).

2. The vector product of two parallel vectors is:
A. Equal to 1 B. Equal to zero
C. Equal to product of their magnitudes
D. Equal to difference of their magnitudes (B)

Explanation : The cross product is ABsinθ. For parallel vectors, θ = 0°, so sin0° = 0.

3. The torque acting on a particle is mathematically expressed as:
A. $\tau = F \cdot r$ B. $\tau = r \times F$
C. $\tau = F \times v$ D. $\tau = m \cdot a$ (B)

Explanation : Torque is defined as the vector product of position vector and force.

4. If the net external force on a system of particles is nonzero, the acceleration of the centre of mass is determined by:
A. Internal forces of particles
B. External forces only
C. Both internal and external forces
D. Mass ratio of particles (B)

Explanation : Internal forces cancel in pairs; only external forces influence the motion of the centre of mass.

5. Which law states that if a right-handed screw rotates in the direction of rotation of a body, then its advancement direction gives angular velocity?
A. Fleming's Left-Hand Rule
B. Right-Hand Law
C. Right-Handed Screw Law
D. Newton's Third Law (C)

Explanation : The screw advances in the direction of angular velocity when rotated according to the body's sense of rotation.

6. The total linear momentum of a system of particles can be expressed as:
A. Sum of masses of particles only
B. Vector sum of momenta of individual particles
C. Arithmetic mean of all velocities
D. Always zero (C)

Explanation : System momentum p = m1v1 + m2v2 + ... + mnvn = M Vcm.

7. In a binary star system, two stars orbit around:
A. Their individual centres
B. The more massive star
C. Their common centre of mass
D. The Sun (C)

Explanation : Each star moves in a trajectory around their common centre of mass.

8. Which property of cross product is not true?
A. A × B = −(B × A)
B. A × (B + C) = A × B + A × C
C. A × A = 0
D. A × B = B × A (D)

Explanation : The cross product is anti-commutative, so option D is false.

9. If an asteroid breaks into two unequal pieces during motion, what happens to the path of the centre of mass?
A. Shifts toward the heavier piece
B. Shifts toward the lighter piece
C. Follows the same trajectory as before breaking
D. Comes to rest (C)

Explanation : The external forces (like gravity) remain unchanged, so the centre of mass continues its original motion.

10. The vector product of unit vectors $\hat{i} \times \hat{j}$ is:
A. $-\hat{k}$ B. $\hat{k}$
C. $\hat{i}$ D. 0 (B)

Explanation : The cyclic relation of unit vectors gives $\hat{i} \times \hat{j} = \hat{k}$.