1. The moment of inertia of a point mass m at a distance r from the axis of rotation is
   A. I = mr B. I = mr^2
   C. I = m^2r D. I = m^2r^2 (B)
Explanation : Moment of inertia depends on both mass and the square of the perpendicular distance from the axis: I = mr^2.

2. Which factor does not affect the moment of inertia of a body?
   A. Mass of the body
   B. Mass distribution about axis
   C. Position of axis of rotation
   D. Velocity of the body (D)
Explanation : MOI depends only on mass, distribution of mass, and axis position — not on linear or angular velocity.

3. Torque acting on a rigid body in rotational motion is expressed as
   A. $\tau = I \alpha$ B. $\tau = I \omega$
   C. $\tau = L \omega$ D. $\tau = L/I$ (A)
Explanation : Resultant torque is proportional to angular acceleration with MOI as the constant: $\tau = I\alpha$.

4. Angular momentum of a rigid body rotating with angular velocity ω is
   A. $L = I \alpha$ B. $L = I \omega$
   C. $L = \tau \omega$ D. $L = E \omega$ (B)
Explanation : Angular momentum is given by the product of MOI and angular velocity: $L = I\omega$.

5. Rotational kinetic energy of a body is
   A. $\frac{1}{2} I \alpha^2$ B. $\frac{1}{2} I \omega^2$
   C. $\frac{1}{2} L^2$ D. $\frac{1}{2} \tau^2$ (B)
Explanation : The energy associated with rotational motion is $E = \frac{1}{2} I \omega^2$.

6. The perpendicular axis theorem states
   A. Iz = Ix - Iy B. Iz = Ix + Iy
   C. Ix = Iy + Iz D. Iy = Ix + Iz (B)
Explanation : For a planar lamina, MOI about a perpendicular axis equals the sum of MOIs about two perpendicular axes in its plane: Iz = Ix + Iy.

7. The parallel axis theorem can be written as
   A. I = IG + md B. $I = IG - md^2$
   C. $I = IG + md^2$ D. $I = IG / md^2$ (C)
Explanation : MOI about any axis parallel to one through the center of mass is $I = IG + md^2$, where d is the distance between the axes.

8. The moment of inertia of a thin rod of length L about an axis through its midpoint and perpendicular to the rod is
   A. $ML^2/2$ B. $ML^2/12$
   C. $ML^2/3$ D. ML^2 (B)
Explanation : For a uniform thin rod about the midpoint and perpendicular to its length: $I = ML^2/12$.

9. The moment of inertia of a solid sphere of mass M and radius R about a diameter is
   A. $2/5\ MR^2$ B. $3/5\ MR^2$
   C. $1/2\ MR^2$ D. MR^2 (A)
Explanation : For a solid sphere about its diameter, the MOI is $2/5\ MR^2$.

10. Which of the following formulas is incorrect?
   A. $\tau = I \alpha$ B. $L = I \omega$
   C. $E = \frac{1}{2} I \omega^2$ D. $\Sigma mr = 2I$ (D)
Explanation : The first three are standard rotational motion formulas. The last one is wrong and not a valid relation.