1. A girl is sitting on a rotating chair with her arms stretched out. When she folds her arms close to her body, her angular velocity will:
A. Increase B. Decrease
C. Remain unchanged
D. Become zero (A)
Explanation : Angular momentum is conserved ($L = I\omega$). When arms are folded, moment of inertia decreases, so angular velocity increases to keep L constant.

2. The radius of gyration (k) is defined such that:
A. $k = I/M$ B. $I = Mk^2$
C. $k = \sqrt{(IM)}$ D. $k = M/I$ (D)
Explanation : Radius of gyration is the equivalent distance from the axis where the entire mass can be assumed to be concentrated to yield the same moment of inertia.

3. The radius of gyration depends on:
A. The total mass of the body only
B. The shape and density of the body only
C. The position of the axis and mass distribution
D. Neither axis nor distribution (C)
Explanation : Radius of gyration is influenced by how the mass is spread relative to the axis, not by the total mass itself.

4. Work done in rotational motion can be expressed as:
A. $W = F \cdot d$ B. $W = \tau\theta$
C. $W = \tau\omega$ D. $W = I\omega^2$ (B)
Explanation : Work in rotation is the product of torque and angular displacement.

5. Power in rotational motion is given by:
A. $P = \tau\omega$ B. $P = Fv$
C. $P = I\alpha$ D. $P = L\omega$ (A)
Explanation : Power is the rate of work done. In rotational dynamics, it is torque multiplied by angular velocity.

6. Which of the following is the correct rotational analogue of Newton's second law?
A. $F = ma$ B. $L = I\omega$
C. $\tau = I\alpha$ D. $p = mv$ (D)
Explanation : Torque plays the same role in rotation as force in linear motion, moment of inertia corresponds to mass, and angular acceleration corresponds to linear acceleration.

7. A solid disc of mass 10 kg and radius 1 m has its radius of gyration (about the central axis) equal to:
A. 1.414 m B. 0.707 m
C. 1 m D. 1.732 m (B)
Explanation : For a solid disc, $I = \frac{1}{2}Mr^2$. Thus, $k = \sqrt{(I/M)} = \sqrt{(r^2/2)} = r/\sqrt{2} = 0.707$ m.

8. Which one is the correct equation of motion in rotational dynamics?
A. $\omega^2 = \omega_0^2 + 2as$ B. $\theta = \omega_0 t + \frac{1}{2}\alpha t^2$
C. $v = u + at$
D. $s = ut + \frac{1}{2}at^2$ (B)
Explanation : This is the rotational analogue of $s = ut + \frac{1}{2}at^2$.

9. If torque acting on a system is zero, then angular momentum will:
A. Increase linearly with time
B. Decrease linearly with time
C. Remain constant
D. Become zero (C)
Explanation : Zero torque implies no change in angular momentum, so it stays constant.

10. Which of the following pairs correctly matches linear and rotational quantities?
A. Displacement ↔ Torque
B. Velocity ↔ Angular displacement
C. Force ↔ Moment of inertia
D. Momentum ↔ Angular momentum (D)
Explanation : Linear momentum ($p = mv$) corresponds to angular momentum ($L = I\omega$) in rotational motion.