Chapter 8

Q5 Yes. The merry-go-round is a rigidly rotating body. All parts along a given line from center to edge are rotating at exactly the same rotational velocity.

Q7 No. Constant acceleration results in constantly changing velocity.

Q11 \( F_1 \) provides the larger torque. \( F_2 \) has a smaller component perpendicular to the radius.

Q16 The plank can be pushed to its center point, for that is where the center of gravity is located. Beyond that point less of the plank’s mass will be supported by the platform than will be hanging over the edge. This condition will result in a net torque downward.

Q23 The hollow sphere has the greater rotational inertia. It has all of its mass at the maximum radius; the solid sphere has most of its mass at smaller radii.

Q31 By definition the clockwise direction as viewed from above results in the rotational velocity vector pointing upward. Therefore the angular momentum vector is pointing upward because it is parallel to the velocity vector, and since the skater is rotating counterclockwise the velocity vector is pointing upward.

E5 a. 4.8 rev/s
   b. 9.6 rev

E8 a. 12 N•m
   b. 6 N•m

E11 a. 96 N•m
   b. -60 N•m
   c. 36 N•m

E16 a. 0.20 kg•m²/s
   b. 0.60 kg•m²/s

SP1 a. 132 N•m; Directed along the merry-go-round axis.
   b. 0.147 rad/s²
   c. 2.2 rad/s
   d. -1.3x10⁻² rad/s²; 165 s after pushing is stopped.