Name _____

Section 8.3 Equilibrium

In your textbook, read about the center of mass and how it affects stability on pages 211–213.
Write the term that correctly completes the statement.

The point on an object that moves in the same way that a point particle would move is the (**1**) _____ of the object. To find the center of mass of an object, first suspend the object from (**2**) _____. When the object is not moving, draw a(n) (**3**) _____ from the suspension point. Repeat this process using another (**4**) _____. The center of mass is the point at which (**5**) _____. The center of mass of an adult human who is standing with his or her arms hanging down is about halfway between the front and the back of the body, a few centimeters below the (**6**) _____.

In an unstable object, the center of mass is (**7**) _____ the base of an object. However, an object is stable if a(n) (**8**) _____ is required to tip it over. A force acts on an object and applies a(n) (**9**) _____ on the object. The (**10**) _____ of the object applies a torque in the opposite direction, as it acts on the (**11**) _____ of the object. When the object tips enough that its center of mass is no longer above its (**12**) _____, both torques act in (**13**) _____ direction(s), and the object tips over. A(n) (**14**) _____ base results in a stable object. An object is also more likely to be stable if its center of mass is located (**15**) _____ in the object.

In your textbook, read about the conditions for equilibrium on pages 213–215.
Answer the following questions. Use complete sentences.

16. What can be said about the velocity and angular velocity of an object that is in static equilibrium?

_____

_____

17. When is an object in translational equilibrium?

_____

_____

18. When is an object in rotational equilibrium?

_____

_____

In your textbook, read about rotating frames of reference, centrifugal "force," and the Coriolis "force" on pages 216–217.

Circle the letter of the choice that best completes the statement.

19. Newton's laws do not apply to a spinning object, because rotating frames of reference are _____ frames.

a. inertial
c. non-accelerated
b. accelerated
d. static

20. If you triple the rotational frequency, the centripetal acceleration _____.

a. increases by a factor of 4
c. increases by a factor of 9
b. decreased by a factor of 4
d. decreases by a factor of 9

21. The apparent force that makes objects seem to be pulled toward the outer edge of a rotating object is _____.

a. the Coriolis "force"
c. centripetal acceleration
b. centrifugal "force"
d. a rotating frame of reference.

22. One condition for the appearance of the Coriolis "force" is _____.

a. a rotating reference frame
c. vertical motion
b. centripetal acceleration
d. straight horizontal movement

23. To an observer stationed on a rotating object, a ball that is thrown across the object appears to _____.

a. follow a straight path
c. have varying speed
b. have vertical motion
d. follow a curved path

24. The Coriolis "force" makes winds rotate _____ in the northern hemisphere.

a. clockwise around low-pressure areas
c. clockwise around high-pressure areas
b. counterclockwise around low-pressure areas
d. counterclockwise around high-pressure areas