Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Chapter 8 - Rotational Motion

True/False

Indicate whether the statement is true or false.

____ 1. Radians indicate the ratio between distance traveled along a circumference and the radius.

____ 2. Angular velocity is the angular displacement divided by time.

____ 3. If the angular velocity is changing, it is not possible to define an average angular velocity, only an instantaneous velocity.

____ 4. The center of mass of an object is the point on the object that moves in the same way that a point particle would move.

____ 5. The center of mass of an object is located by hanging the object and then drawing a horizontal line from the point of suspension, and then repeating the process a second time. The center of mass falls at the intersection of the two lines.

____ 6. The center of mass of an object is that point on the object that moves in the same way that a point particle would move.

____ 7. An object is stable if an external force is required to tip it.

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 8. A grad is a unit of measurement equal to _____.
a. 1/400 of a revolution
b. 1/360 of a revolution
c. $1/(2\pi)$ of a revolution
d. 1/4 of a revolution

____ 9. A degree is a unit of measurement equal to _____.
a. 1/400 of a revolution
b. 1/360 of a revolution
c. $1/(2\pi)$ of a revolution
d. 1/4 of a revolution

____ 10. A radian is a unit of measurement equal to _____.
a. 1/400 of a revolution
b. 1/360 of a revolution
c. $1/(2\pi)$ of a revolution
d. 1/4 of a revolution

____ 11. The relationship between linear displacement and angular displacement is given by:
a. $v = d/t$
b. $a = r\alpha$
c. $v = r\omega$
d. $d = r\theta$

____ 12. The relationship between linear velocity and angular velocity is given by:
a. $v = d/t$
b. $a = r\alpha$
c. $v = r\omega$
d. $d = r\theta$

____ 13. The angular velocity of an object, ω, is given by:
a. $\alpha = \Delta\omega/\Delta t$
b. $\omega = \Delta\theta/\Delta t$
c. $d = r\theta$
d. $v = r\omega$

____ 14. If the angular position is plotted as a function of time, the angular velocity would be
a. an individual point on the graph.
b. equal to the angular acceleration.
c. the slope of the graph.
d. none of the above.

____ 15. Which of the following is NOT a condition of static equilibrium?
a. The velocity of the object is zero.
b. The angular velocity of the object is zero.
c. The angular velocity of the object is constant.
d. The velocity of the object is changing.

Completion

Complete each statement.

16. As an object rotates, the change in the angle is called the _____.

Problem

17. A disc of radius 5.70 cm rotates about its axis and a point 1.90 cm from the center of the disc moves 34.5 cm in 12.2 s. Calculate the angular speed of the disc.

18. A car wheel turns through 277° in 10.7 s. Calculate the angular speed of the wheel.

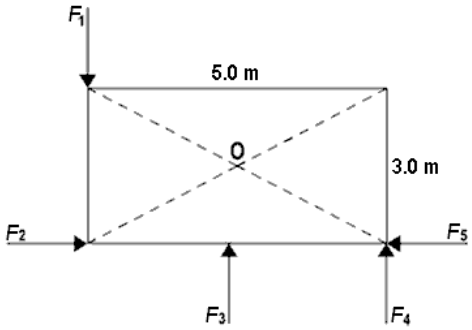
19. A torque acts on a wheel rotating at 19.8 rad/s and increases its angular speed to 23.5 rad/s in 11.2 s. Find the angle through which the wheel turns during this time.

20. A car travels at 1.70 m/s. The driver accelerates and increases the speed to 10.7 m/s in 2.20 s. If the radius of its wheel is 0.590 m, calculate the angle turned by the wheel during this time.

21. A beam that weighs 10.0 N/m is 2.5 m long. It is supported at a point 0.78 m from one end. Find the weight of the object that must be placed on the other end of the beam to balance it.

22. A worker sits at one end of a 183-N uniform rod that is 2.80 m long. A weight of 107 N is placed at the other end of the rod. The rod is balanced when the pivot is 0.670 m from the worker. Calculate the weight of the worker.

23. Calculate the net torque on the rectangular plate about the point O. Force F_1 is 12.0 N, F_2 is 21.0 N, F_3 is 12.0 N, F_4 is 16.0 N, and F_5 is 19.0 N.



24. A 1.29-m long ladder weighing 200 N rests against a vertical wall so that the top of the ladder is at a height of 0.590 m. A 603-N man stands on the ladder at a distance of 0.390 m along the ladder. Calculate the force exerted by the wall on the ladder. Assume that the wall is perfectly smooth.