ANGULAR KINEMATICS PRACTICE

1. A tire rotates at a constant 1.7 radians angle every 0.15 s. A) What is the tire's angular velocity? B) If the tire has a diameter of tire is 70 cm, what is the linear speed of the car?

2. A flywheel speeds up uniformly from rest to 900 rpm in 2 minutes. A) Find the angular acceleration. B) Find the tangential acceleration of the rim if the flywheel has a 0.5 m radius.

3. A CD player spins at 8590 rpm. If it starts from rest and has an acceleration of 450 rad/s^2, how long does it take to reach full speed?

4. A rotating machine has an initial angular speed of 1.6 rad/s accelerates uniformly at a rate of 0.5 rad/s^2 for 5.0 seconds. A) What is its angular displacement during this time? B) How many revolutions is this?

5. A DJ speeds up a turntable uniformly from 33.3 rpm to 45 rpm. In doing so, the turntable goes through 4 revolutions. What is the angular acceleration of the table?

6. A flywheel slows from 250 rpm to 150 rpm in 4.2 seconds. How many revolutions occur during this time?

7. You are driving your car at 55 mph (24.6 m/s). Your car has 15-inch radius tires (1 inch = 2.54 cm). What is the angular speed of the tires?

8. A ball rolls down a 1.0-meter long incline from rest to 2.0 m/s. The ball has a 5.0 cm radius. Find the angular acceleration of the ball.

9. A soccer ball is rolling at 15r/s. It stops rolling after traveling 25.0 m. Calculate the time it was rolling. Also find its angular acceleration. The ball has 20 cm diameter.

10. A basketball is spun on a player's finger. The ball starts with a rotational speed of 10 r/s and stops in 4.5 seconds. Find the angle through which the ball rotated? Find the initial linear speed of the edge of the ball if the diameter is 10 inches.

11. A spool of thread is mounted on a spindle so that when the thread is pulled, the spool rotates. The spool starts at rest. The thread is pulled so that the spool has an angular acceleration of 1.0r/s^2. The spool is 2.5 cm in diameter. What linear speed is required to maintain this acceleration after 25.0 second?

ANSWERS: 1. 11.3 r/s, 4.0 m/s; 2. 0.79 r/s^2, 0.39 m/s^2; 3. 2.0 s; 4. 14.3 rad, 2.3 rev; 5. 0.2 r/s$^{2;}$ 6. 14. Rev; 7. 64.7 r/s; 8. 40r/s^2; 9. 33.3s, -0.5r/s^2; 10. 22.5 r, 1.25 m/s; 11. 0.31 m/s