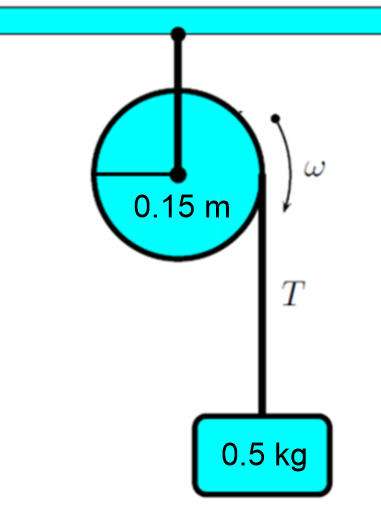
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**AP Physics 1: Angular Kinematics**

1. A wheel starts from rest and rotates with constant angular acceleration to an angular speed of 12 rad/s in 3 s.
   1. Find the magnitude of the angular acceleration of the wheel.
   2. Find the angle in radians through which it rotates in this time.
2. At t = 0, a wheel rotating about a fixed axis at a constant angular deceleration of 0.43 rad/s2 has an angular velocity of 1.5 rad/s and an angular position of 2.3 rad. What is the angular position of the wheel after 2 s?
3. A dentist's drill starts from rest. After 3.2 s of constant angular acceleration it turns at a rate of 25100 rev/min. Find the drill's angular acceleration. Throughout what angle does the drill rotate during this period?
4. An electric motor rotating a workshop grinding wheel at a rate of 200 rev/min is switched off. Assume constant angular deceleration of magnitude 2 rad/s2. Through how many revolutions does the wheel turn before it finally comes to rest?
5. A racing car travels on a circular track of radius 250 m. The car moves with a constant linear speed of 45 m/s, find its angular speed.
6. A car accelerates uniformly from rest and reaches a speed of 22 m/s in 9 s. The diameter of a tire is 0.29 m.
   1. Find the number of revolutions the tire makes during this motion, assuming no slipping.
   2. What is final rotational speed of the tire?
7. The turntable of a record player rotates initially at a constant rate of 33 rev/min with a radius of 0.15 m.
   1. What is its angular speed?
   2. Through what angle does it rotate in 1.5 s?

The power turned off and it takes the turntable 20 s to come to rest.

* 1. What is the angular acceleration of the turntable, assuming it is uniform?
  2. How many rotations does the turntable make before coming to rest?



1. A wheel of radius 0.15 m is mounted on a frictionless, horizontal axle as in the figure. A light cord wrapped around the wheel supports a block with a mass of 0.5 kg. When released from rest, the block falls, accelerating uniformly, 3.8 m in 1.2 s.
   1. What is the linear acceleration of the block?
   2. What is the final velocity of the block?
   3. What is the angular acceleration of the wheel?
   4. What is the final velocity of the wheel?
   5. Through how many radians did the wheel turn?
   6. Graph the angular displacement, angular velocity and angular acceleration vs. time. Use a separate sheet of paper if needed.