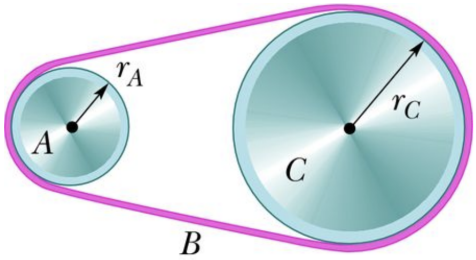
Please upload your solution to Problem 3 to canvas for marking after the workshop.

Problem 1

What is the angular speed (in radians per second) of the following components of the minute hand of a smoothly running analog watch?

Problem 2

In the figure below, wheel A of radius $r_A = 10$ cm is coupled by belt B to wheel C of radius $r_C = 25$ cm. The angular speed of wheel A is increased from rest at a constant rate of 1.6 rads^{-2}. Find the time needed for wheel C to reach an angular speed of 100 rev/min, assuming the belt does not slip.



Problem 3

A 0.400 kg ball is shot directly upward at initial speed 40.0 ms^{-1}. What is its angular momentum about P, 2.00 m horizontally from the launch point, when the ball is
(a) at maximum height?
(b) halfway back to the ground?
What is the torque on the ball about P due to the gravitational force when the ball is
(c) at maximum height?
(d) halfway back to the ground?

Problem 4

A uniform solid sphere rolls down an incline.
(a) What must be the incline angle if the linear acceleration of the centre of the sphere is to have a magnitude of $0.10g$?
(b) If a frictionless block were to slide down the incline at that angle, would its acceleration magnitude be more than, less than, or equal to $0.10g$? Why?

Want more practice?

Further problems on Angular Variables: Chapter 10.1-10.4
Further problems on Inertia & Torque: Chapter 10.5-10.8
Further problems on Rolling & Angular Momentum: Chapter 11