

ME 104: Homework 7

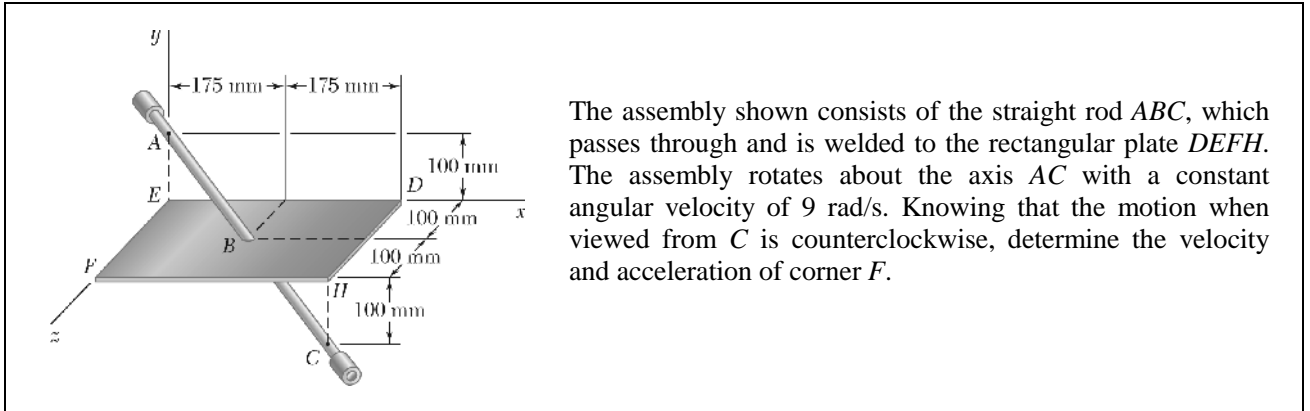
Prof. Karl Hedrick: University of California, Berkeley

Due Monday, November 9th

Chapter 15, Problem 8

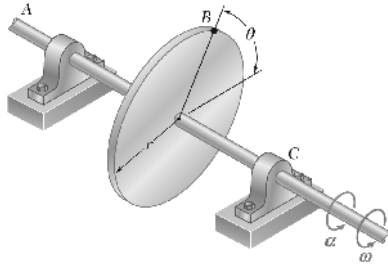
The rotor of a gas turbine is rotating at a speed of 6900 rpm when the turbine is shut down. It is observed that 4 min is required for the rotor to coast to rest. Assuming uniformly accelerated motion, determine (a) the angular acceleration, (b) the number of revolutions that the rotor executes before coming to rest.

Chapter 15, Problem 10



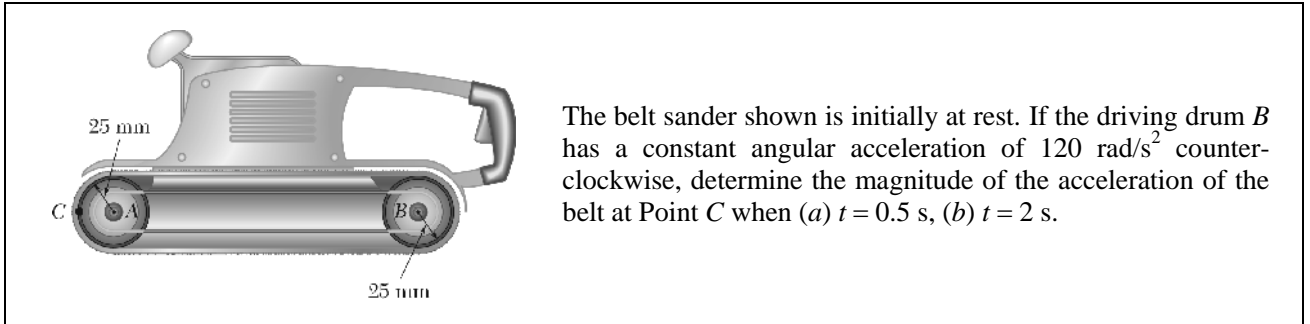
The assembly shown consists of the straight rod ABC , which passes through and is welded to the rectangular plate $DEFH$. The assembly rotates about the axis AC with a constant angular velocity of 9 rad/s. Knowing that the motion when viewed from C is counterclockwise, determine the velocity and acceleration of corner F .

Chapter 15, Problem 18



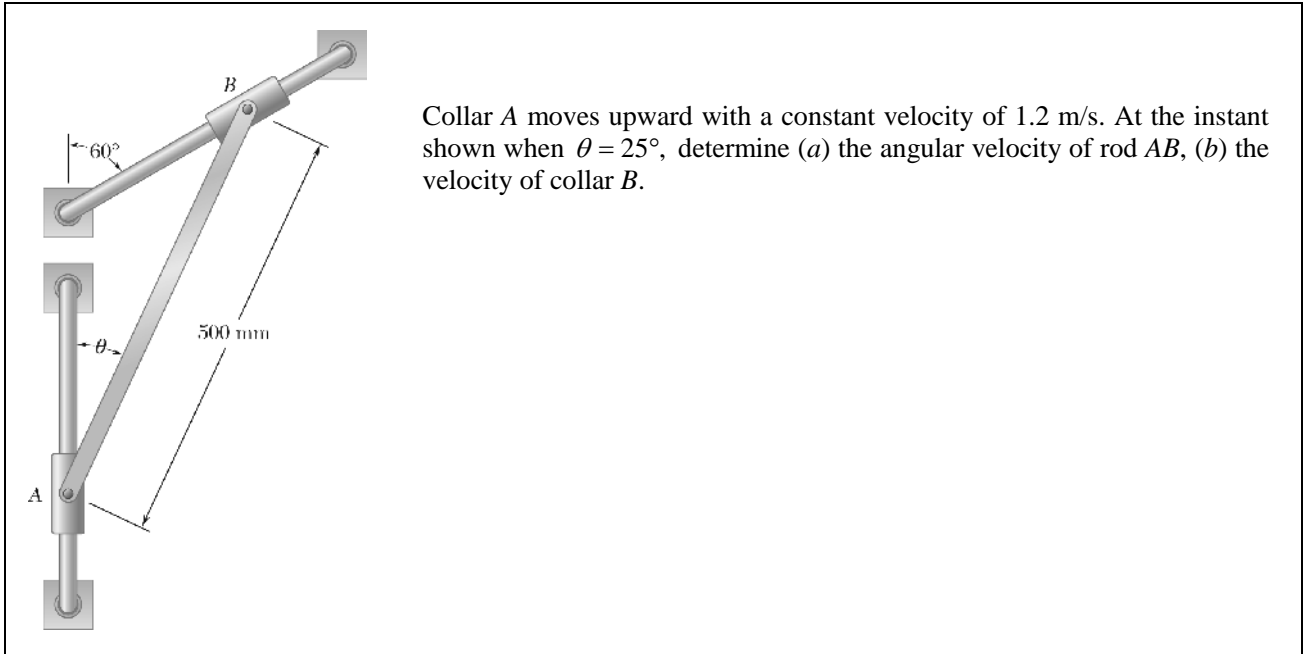
The circular plate shown is initially at rest. Knowing that $r = 200$ mm and that the plate has a constant angular acceleration of 0.3 rad/s^2 , determine the magnitude of the total acceleration of Point B when (a) $t = 0$, (b) $t = 2$ s, (c) $t = 4$ s.

Chapter 15, Problem 23



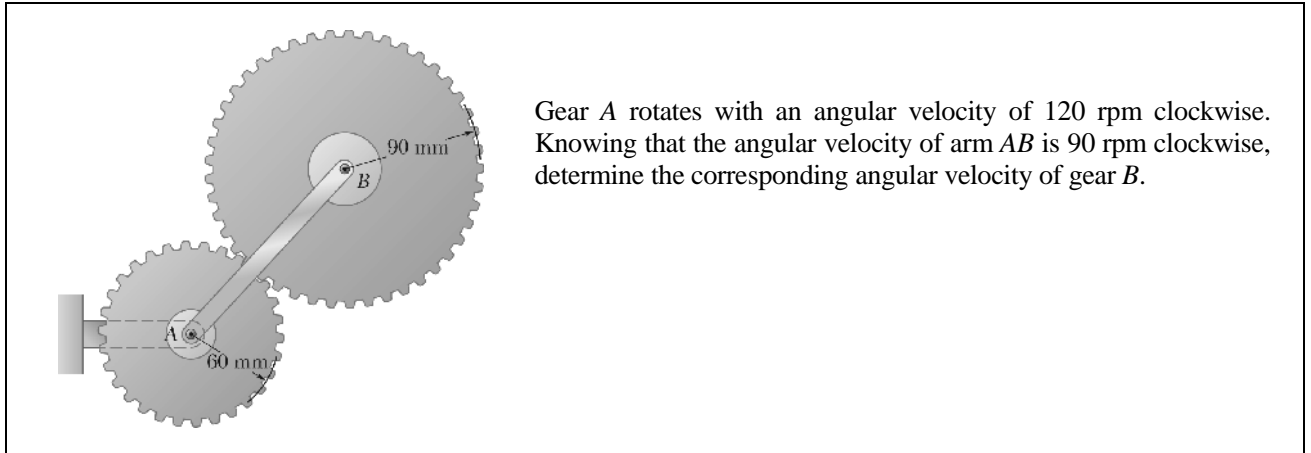
The belt sander shown is initially at rest. If the driving drum B has a constant angular acceleration of 120 rad/s^2 counter-clockwise, determine the magnitude of the acceleration of the belt at Point C when (a) $t = 0.5 \text{ s}$, (b) $t = 2 \text{ s}$.

Chapter 15, Problem 41



Collar *A* moves upward with a constant velocity of 1.2 m/s. At the instant shown when $\theta = 25^\circ$, determine (a) the angular velocity of rod *AB*, (b) the velocity of collar *B*.

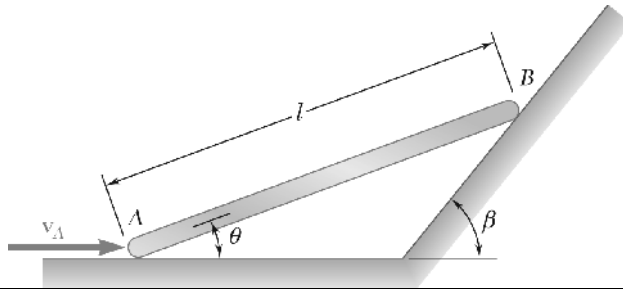
Chapter 15, Problem 50



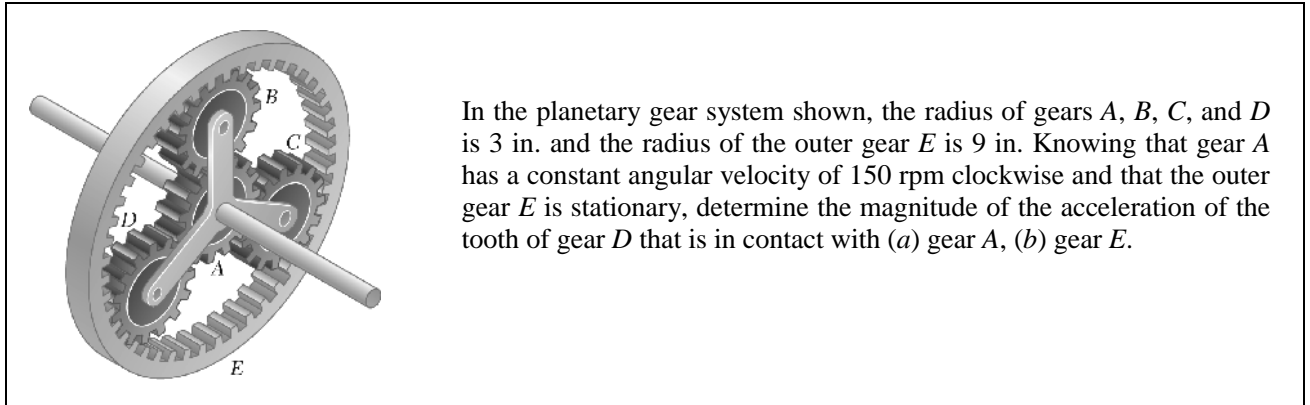
Gear A rotates with an angular velocity of 120 rpm clockwise. Knowing that the angular velocity of arm AB is 90 rpm clockwise, determine the corresponding angular velocity of gear B .

Chapter 15, Problem 89

Rod AB can slide freely along the floor and the inclined plane. Knowing that $\theta = 20^\circ$, $\beta = 50^\circ$, $l = 0.6$ m, and $v_A = 3$ m/s, determine (a) the angular velocity of the rod, (b) the velocity of end B .



Chapter 15, Problem 119



In the planetary gear system shown, the radius of gears A , B , C , and D is 3 in. and the radius of the outer gear E is 9 in. Knowing that gear A has a constant angular velocity of 150 rpm clockwise and that the outer gear E is stationary, determine the magnitude of the acceleration of the tooth of gear D that is in contact with (a) gear A , (b) gear E .