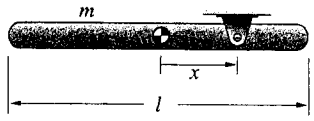
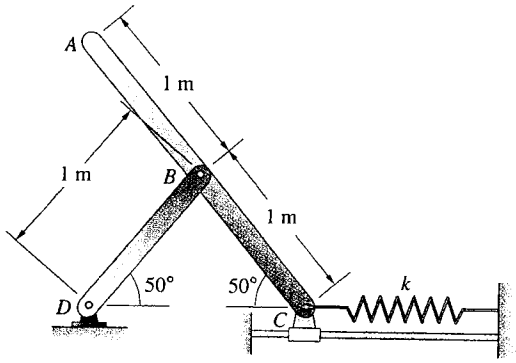
HW 7 ME230

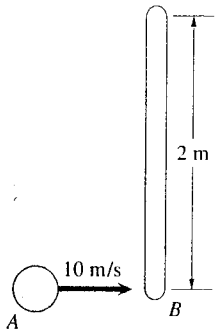
The slender bar is released from rest in the position shown. (a) Use conservation of energy to determine the angular velocity when the bar is vertical.
(b) For what value of x is the angular velocity determined in part (a) a maximum?



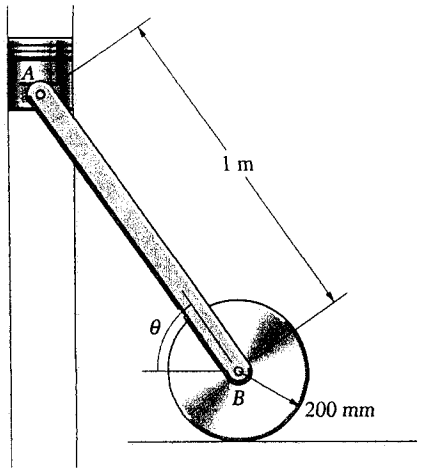
3 The system is in equilibrium in the position shown. The mass of the slender bar ABC is 6 kg, the mass of the slender bar BD is 3 kg, and the mass of the slider at C is 1 kg. The spring constant is $k = 200$ N/m. If a constant 100-N downward force is applied at A, what is the angular velocity of bar ABC when it has rotated 20° from its initial position?



5 . The 1-kg sphere A is moving at 10 m/s when it strikes the end of the 4-kg stationary slender bar B. If the sphere adheres to the bar, what is the bar's angular velocity after the impact?

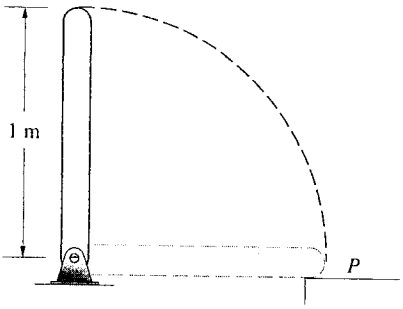


2 . The 4-kg slender bar is pinned to a 2-kg slider at A and to a 4-kg homogeneous cylindrical disk at B. Neglect the friction force on the slider and assume that the disk rolls. If the system is released from rest with $\theta = 60°$, what is the bar's angular velocity when $\theta = 0$?



4 . The 2-kg slender bar starts from rest in the vertical position and falls, striking the smooth surface at P. The coefficient of restitution of the impact is $e = 0.5$. When the bar rebounds, through what angle relative to the horizontal will it rotate?

Strategy: Use the coefficient of restitution to relate the bar's velocity at P just after the impact to its value just before the impact.



6 . The 20-kg homogeneous rectangular plate is released from rest (Fig. a) and falls 200 mm before coming to the end of the string attached at the corner A (Fig. b). Assuming that the vertical component of the velocity of A is zero just after the plate reaches the end of the string, determine the angular velocity of the plate and the magnitude of the velocity of the corner B at that instant.