

Homework of chapter 7

Date:

Name:

Student ID:

1 and 2、 A slender 9-lb rod can rotate in a vertical plane about a pivot at B. A spring of constant $k=30\text{ lb/ft}$ and of unstretched length of 6 in. is attached to the rod as shown. Knowing that the rod released from the rest in the position shown, determine its angular velocity after it has rotated through 90° . ($I_G=0.09317\text{ lb ft s}^2$)

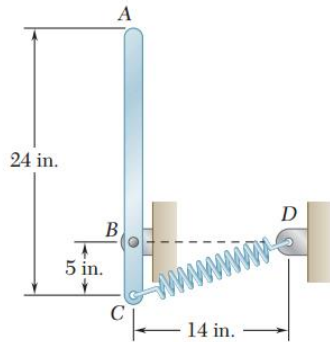


Fig.1

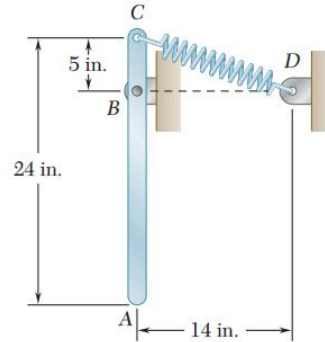


Fig.2

3、 The motion of the uniform rod AB is guided by small wheels of negligible mass that roll on the surface shown. If the rod is released from rest when $\Theta=0$, determine the velocities of A and B when $\Theta=30^\circ$. ($I_G=1/12(mL^2)$)

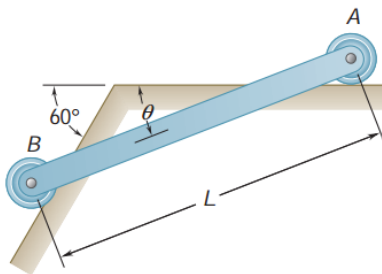


Fig.3

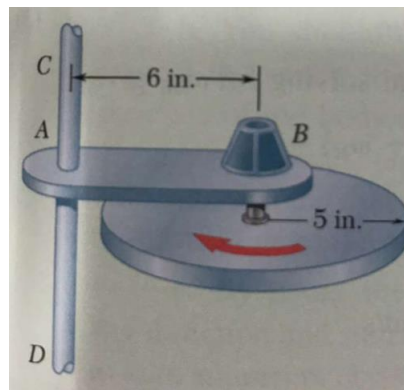


Fig.4

4、 A 10-lb uniform disk is attached to the shaft of a motor mounted on arm AB that is free to rotate about the vertical axle CD . The arm-and-motor unit has a moment of inertia of 0.032 lb ft s^2 about axle CD . Knowing that the system is initially at rest, determine the angular velocities of the arm and of the disk when the motor reaches a speed of 360 rpm. (the mass moment of inertia of disk B about its center of mass : $I_B=0.02696\text{ lb ft s}^2$)