Homework #4

Due Monday 1 October 2001

Reading and problems are taken from R.C. Hibbeler, *Engineering Mechanics Dynamics*, Ninth Edition, Prentice-Hall, 2001.

Reading: Chapter 14

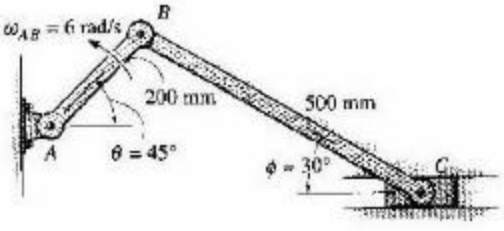
Problems:

1. (10 points) 13-79. Do NOT use the hint given in the text; instead, use conservation of mechanical energy.
2. (10 points) You have solved 13-82 in Homework #3. Use conservation of mechanical energy to further compute
   - the velocity of the collar at the instant when the collar reaches the mid-point of the circular rod.
   - the acceleration of the collar at the same instant WITHOUT using Newton's Second Law directly. *Hint*: differentiate the equation of conservation of energy.
3. (10 points) 14-79
4. (10 points) 14-83
5. (10 points) 14-86
6. (10 points) 14-95

Adams Problem:
(20 points) Solve problem 16-65 of Hibbeler, eighth edition (given below), using Adams. You will need three rigid bodies (not including ground), three hinge joints, and a translational joint. The slider block should be modeled as a rigid-body connected to ground by a translational joint and connected to the 500mm link by a hinge joint.

Submit an isometric view of your model with joints and markers visible. Also, submit plots of theta vs. time, phi vs. time, and the velocity of C vs. time. Indicate on the plots the velocity of C at the three specified values of theta.

16-65. If bar AB has an angular velocity $\omega_{AB} = 6$ rad/s, determine the velocity of the slider block C at the instant $\theta = 45°$ and $\phi = 30°$. Also, sketch the location of bar BC when $\theta = 30°, 45°$, and $60°$ to show its general plane motion.



Prob. 16–65