

## Problem Set 13

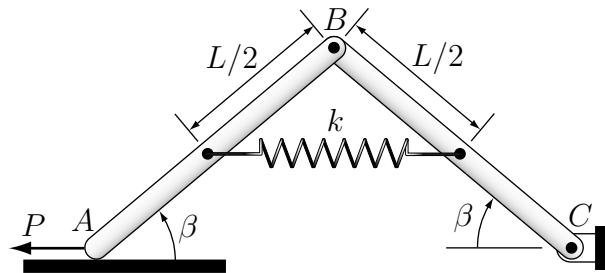
### Due April 29, 1999

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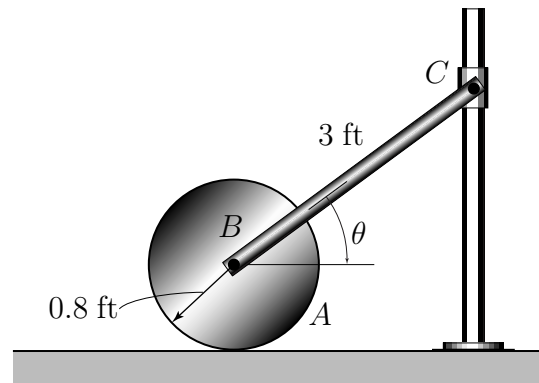
Spring 1999

**Problem 1**

Two identical members,  $AB$  and  $BC$ , are pinned together at  $B$ . Also member  $BC$  is pinned to the wall at  $C$ . Each member weighs 32.2 lb and is 20 ft long. A spring having a spring constant  $k = 20$  lb/ft is connected to the centers of the members. A force  $P = 100$  lb is applied to member  $AB$  at  $A$ . If initially the members are inclined  $45^\circ$  to the ground and the spring is unstretched, what is  $\beta$  after  $A$  has moved 2 ft? The system is in the vertical plane.

**Problem 2**

The system consists of a 20 lb disk  $A$ , a 4 lb slender rod  $BC$ , and a 1 lb smooth collar  $C$ . If the disk rolls without slipping, determine the velocity of the collar at the instant  $\theta = 30^\circ$ . The system is released from rest when  $\theta = 45^\circ$ .

**Problem 3**

The two bars shown are homogeneous, bar  $AB$  has mass  $m$ , and bar  $BC$  has mass  $2m$ . Determine the angular velocity of each of the bars when they become colinear if the system is released from rest in the position shown.

