

**FIGURE P10-5**

Problems 10-30 to 10-31 and 10-33

- †10-30 Figure P10-5 shows a cam-follower system that drives slider 6 through an external output arm 3. Arms 2 and 3 are both rigidly attached to the 0.75-in-dia shaft X-X, which rotates in bearings that are supported by the housing. The pin-to-pin dimensions of the links are shown. The cross-sections of arms 2, 3, and 5 are solid, rectangular 1.5 × 0.75 in steel. The ends of these links have a full radius equal to one-half of the link width. Link 4 is 1-in-dia × 0.125 wall round steel tubing. Link 6 is a 2-in-dia × 6-in-long solid steel cylinder. Find the effective mass and effective spring constant of the follower train referenced to the cam-follower roller if the spring at A has a rate of 150 lb/in.
- †10-31 The spring in Figure P10-5 has a rate of 150 lb/in with a preload of 60 lb. Determine the effective spring constant and preload of the spring as reflected back to the cam-follower. See Problem 10-30 for detail about the system needed to solve the problem.
- †10-33 What is the amount by which the roller arm of Problem 10-30 must be extended on the opposite side of the pivot axis O_2 in order to make the pivot axis a *center of rotation* if the point where the cam-follower is mounted is a *center of percussion*?

† These problems are suited to solution using *Mathcad*, *Matlab*, or *TKSolver* equation solver programs.