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-section of arms 2, 3, and 5 are solid, rectangular 1.5 x 0.75 steel. The
ends of these links have a full radius equal to one half of the link width. Link 4 is 1-in-dia
x 0.125 wall round steel tubing. Link 6 is a 2-in-dia x 6-in long solid steel cylinder. Find
the effective mass and effective spring constant of the follower train referenced to the
cam-follower roller.

[†]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 a description of the system.

[†]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 T*KSolver*
equation solver programs.