1) Plot the crank torque required to drive the web cutter at constant crank speed 60 rpm CCW through one full revolution of the crank. Assume that the mechanism operates in a vertical plane, that there are no external forces on the mechanism other than the weight of the links, and that friction is negligible. Neglect cutting forces.

2) What are the bearing reactions and crank torque for part 1) when = 85.5 degrees?

T1on2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ F1on2 ( , )T F2on3 ( , )T

 F3on4 ( , )T F1on4 ( , )T

3) Assume that the crank of the web cutter is rotating at constant crank speed 60 rpm CCW when the crank motor power is suddenly cut at = 85.5°. Determine the acceleration of the crank at the moment when crank torque is cut to zero, and predict crank angle and crank speed at h = 0.05 seconds later.

use  and 

 \_\_\_\_\_\_\_\_\_\_\_\_\_  at h later \_\_\_\_\_\_\_\_\_\_\_\_\_  at h later \_\_\_\_\_\_\_\_\_\_\_\_\_

4) Check the kinematic consistency of your  and  predicted at h later.

max abs  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ max abs  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**EXTRA CREDIT**

Determine the STATIC crank torque and bearing reactions at = 85.5° required to produce 10 N vertical cutting force between cutters P and Q of the web cutter. Assume there are no external forces on the mechanism other than the vertical cutting forces. Assume that friction is negligible. Do not include the weight of the links. Do not include dynamic effects.

T1on2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ F1on2 ( , )T F2on3 ( , )T

 F3on4 ( , )T F1on4 ( , )T

**EXTRA EXTRA CREDIT**

Use velocities and virtual work to determine STATIC crank torque at = 85.5° per above.

T1on2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_