



FIGURE P11-4

Problem 11-9 to 11-10

- †11-9 Figure P11-4a shows a fourbar linkage and its dimensions in meters. The steel crank and rocker have uniform cross sections of 50 mm wide by 25 mm thick. The aluminum coupler is 25 mm thick. In the instantaneous position shown, the crank O_2A has $\omega = 10$ rad/sec and $\alpha = 5$ rad/sec². There is a vertical force at P of $F = 100$ N. Find all pin forces and the torque needed to drive the crank at this instant.
- †11-10 Figure P11-4b shows a fourbar linkage and its dimensions in meters. The steel crank and rocker have uniform cross sections of 50 mm wide by 25 mm thick. The aluminum coupler is 25 mm thick. In the instantaneous position shown, the crank O_2A has $\omega = 15$ rad/sec and $\alpha = -10$ rad/sec². There is a horizontal force at P of $F = 200$ N. Find all pin forces and the torque needed to drive the crank at this instant.

† These problems are suited to solution using *Mathcad*, *Matlab*, or *TKSolver* equation solver programs. In most cases, your solution can be checked with program FOURBAR.