



FIGURE P11-5

Problems 11-11 to 11-12 (p. 617)

‡11-11 Figure P11-5a (p. 621) shows a fourbar linkage and its dimensions in meters. The steel crank, coupler, and rocker have uniform cross sections of 50 mm wide by 25 mm thick. In the instantaneous position shown, the crank  $O_2A$  has  $\omega = 15$  rad/sec and  $\alpha = -10$  rad/sec<sup>2</sup>. There is a vertical force at  $P$  of  $F = 500$  N. Find all pin forces and the torque needed to drive the crank at this instant.

\*‡‡11-12 Figure P11-5b shows a fourbar linkage and its dimensions in meters. The steel crank, coupler, and rocker have uniform cross sections of 60-mm diameter. In the instantaneous position shown, the crank  $O_2A$  has  $\omega = -10$  rad/sec and  $\alpha = 10$  rad/sec<sup>2</sup>. There is a horizontal force at  $P$  of  $F = 500$  N. Find all pin forces and the torque needed to drive the crank at this instant.

\* Answers in Appendix F.

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

‡ These problems are suited to solution using program LINKAGES which is on the attached DVD.