

H.W. # 9

**Due** on Wednesday 18-11-1428 / 28-11-2007 (any time)

**Deadline** for submission: **Saturday 21-11-1428 / 1-12-2007 (before you sit in class)**

- 1- Determine the components of all forces acting on member  $ABCD$  of the assembly shown in Fig. P1. [Sec. 6.6] (20 pts.)
- 2- A hydraulic cylinder has been locked in the position shown in Fig. P2. Knowing that  $\theta = 10^\circ$ , determine
  - (a) the force  $P$  for which the tension in link  $EF$  is 450 N,
  - (b) the corresponding force exerted on member  $ADF$  at point  $D$ . [Sec. 6.6] (15 pts.)
- 3- In the boltcutter shown in Fig. P3, determine the magnitude of the forces exerted by the cutter on the bolt. [Sec. 6.6] (20 pts.)
- 4- A retractable shelf is maintained in the position shown in Fig. P4 by two identical linkage-and-spring systems; only one of the systems is shown. A 20-kg machine is placed on the shelf so that half of its weight is supported by the system shown. Determine
  - (a) the force in link  $AB$ ,
  - (b) the tension in the spring. [Sec. 6.6] (20 pts.)
- 5- The action of a backhoe bucket is controlled by three hydraulic cylinders, as shown in Fig. P5. Determine the force exerted by each cylinder in supporting the 3000-lb load shown. [Sec. 6.6] (25 pts.)

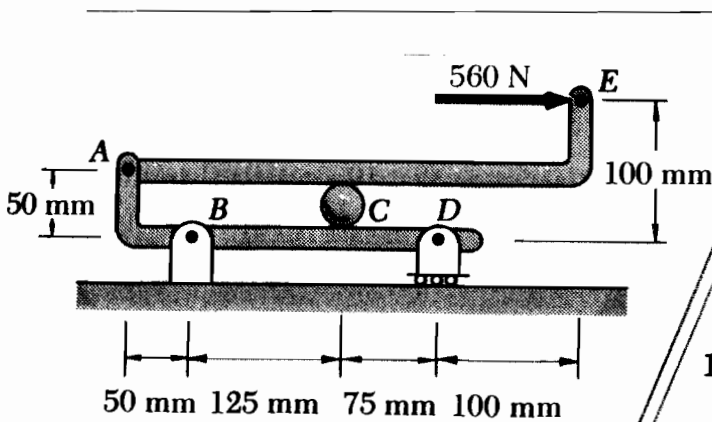


Fig. P1

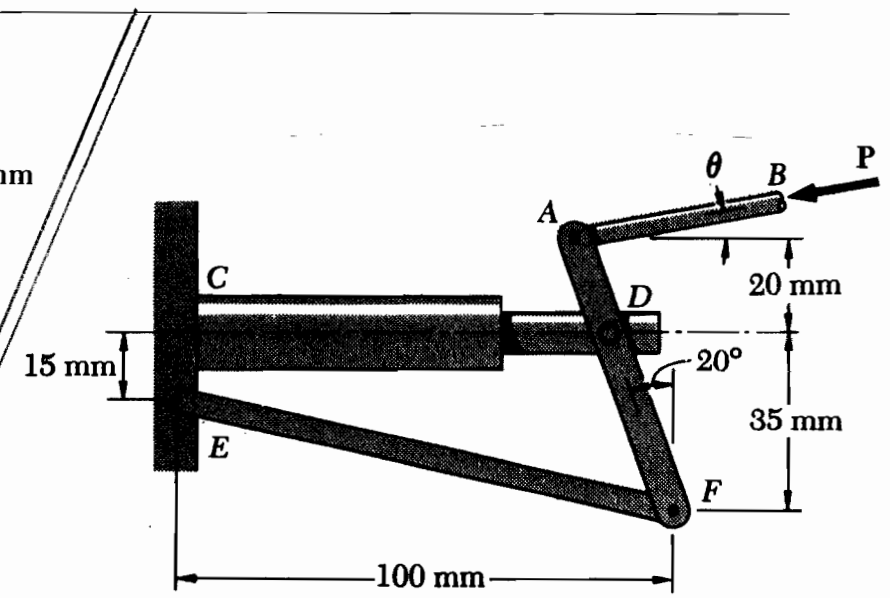


Fig. P2

**Do your work yourself!!** Remember that the homework carries 20% of the course grade; in addition, *solving it is the best way to understand the subject.* Of course, you can seek my help anytime in the homework as well as in anything else.

As an engineer, review the guidelines for submitting homework assignments given to you in class **BEFORE** you start solving and writing the homework. **DO NOT SUBMIT THE HOMEWORK IF YOU DO NOT FOLLOW ALL THESE GUIDELINES.** Cheating, copying, etc. is .....!!!!!!

