

H.W. # 7

**Due** on Wednesday 4-10-1428 / 14-11-2007 (any time)

**Deadline** for submission: **Saturday 7-10-1428 / 17-11-2007 (before you sit in class)**

- 1- The derrick shown in Fig. P1 supports a 4000-lb load. It is held by a ball-and-socket at  $A$  and by two cables attached at points  $D$  and  $E$ . In the position shown, the derrick stands in a vertical plane forming an angle  $\phi = 20^\circ$  with the  $xy$  plane. Determine the tension in each cable and the reactions at  $A$ . [Secs. 5.5 – 5.7] (25 pts.)
- 2- As shown in Fig. P2, a 2.5-m boom is held by a ball-and-socket at  $A$  and by two cables  $EBF$  and  $DC$ ; the cable  $EBF$  passes around a frictionless pulley at  $B$ . Determine the tension in each cable. [Secs. 5.5 – 5.7] (20 pts.)
- 3- A 20-kg door is made self-closing by hanging a 15-kg counterweight from a cable attached at  $C$ , as shown in Fig. P3. The door is held open by a force  $\mathbf{P}$  applied at the knob  $D$ , in a direction perpendicular to the door. Determine the magnitude of  $\mathbf{P}$  and the reactions at  $A$  and  $B$  when  $\theta = 90^\circ$ . It is assumed that the hinge at  $A$  does not exert any axial thrust. [Secs. 5.5 – 5.7] (20 pts.)
- 4- The 23-kg plate  $ABCD$  shown in Fig. P4 measures 325 by 450 mm; it is held by hinges along edge  $AD$  and the wire  $BE$ . Determine the tension in the wire. [Secs. 5.5 – 5.7] (15 pts.)
- 5- Two rods are welded together to form a T-shaped lever which leans against a frictionless vertical wall at  $D$  and is supported by bearings at  $A$  and  $B$ , as shown in Fig. P5. A vertical force  $\mathbf{P}$  of magnitude 400 N is applied at the midpoint of rod  $DC$ . Determine the reaction at  $D$ . [Secs. 5.5 – 5.7] (20 pts.)

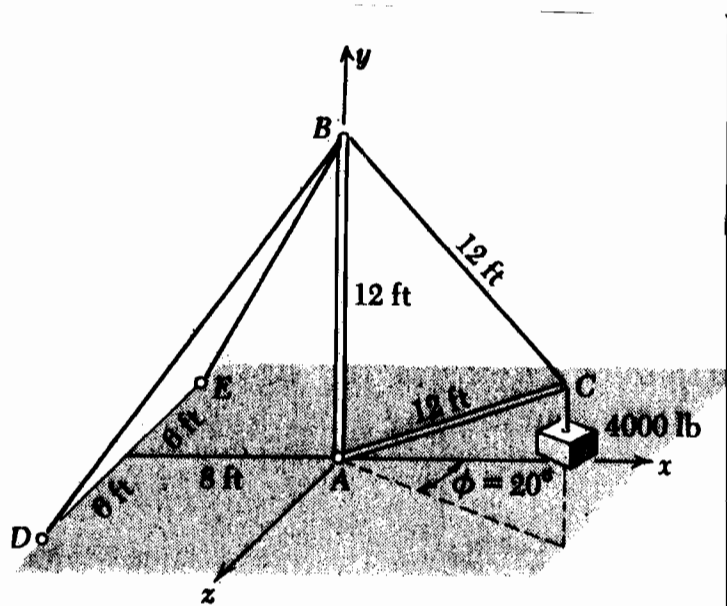


Fig. P1

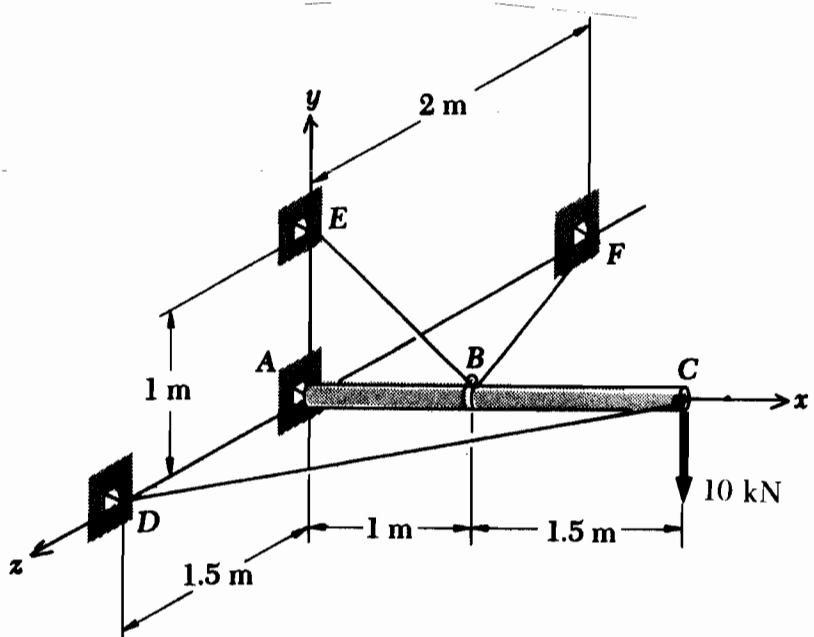


Fig. P2

**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 .....!!!!!!

Fig. P3

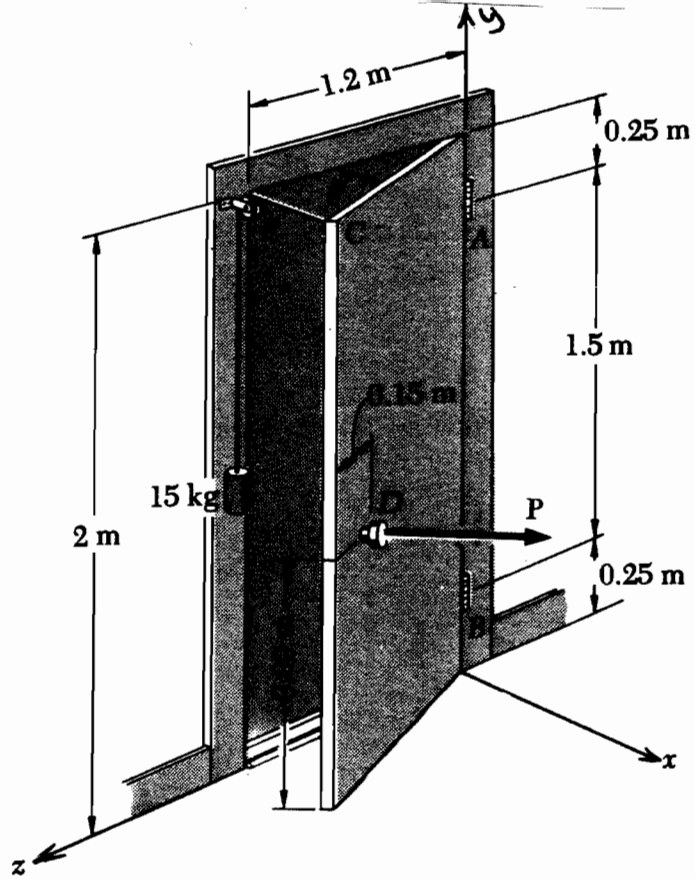


Fig. P4

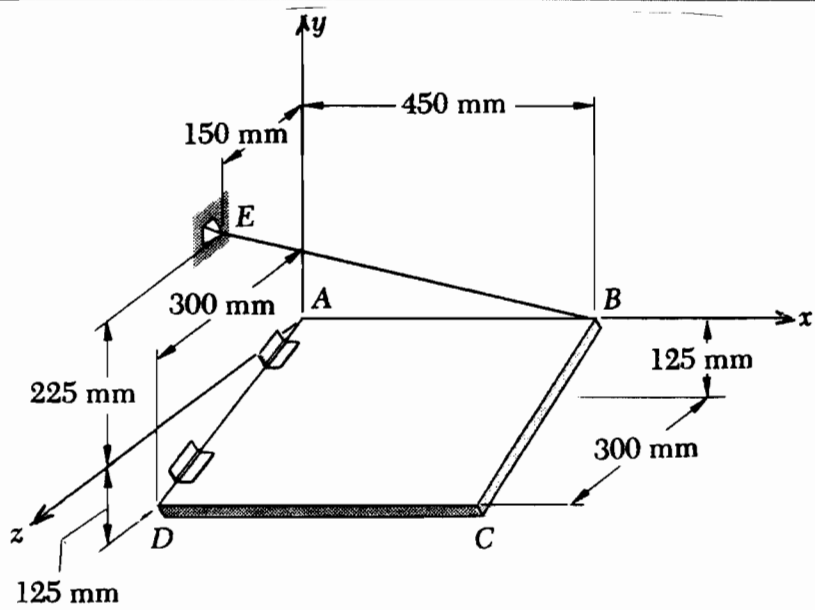


Fig. P5

