

King Fahd University of Petroleum & Minerals  
**CIVIL ENGINEERING DEPARTMENT**

**CE 203 STRUCTURAL MECHANICS I (Section 3)**  
 Second Semester 1429 / 2008 (072)

**H.W. # 9**

**Due** on Sunday 28-4-1429 / 4-5-2008 (any time)

**Deadline** for submission: **Monday 29-4-1429 / 5-5-2008 (before you sit in class)**

- 1) Determine the values and locations of the maximum tensile and compressive stresses in the beam shown in Fig. P1. [Secs. 6.3 & 6.4] (20 pts.)
- 2) For the beam shown in Fig. P2, determine the minimum value of the cross sectional dimension  $a$  if the normal stress is not to exceed 80 MPa (T), or 60 MPa (C). [Secs. 6.3 & 6.4] (15 pts.)
- 3) For the beam shown in Fig. P3, determine the maximum allowable load  $P$  which can be applied if the allowable stresses on the section are 80 MPa in tension and 50 MPa in compression. [Secs. 6.3 & 6.4] (15 pts.)
- 4) What is the maximum load  $W$  which can be applied on the beam shown in Fig. P4 if  $(\sigma_{allow})_T = 100$  MPa and  $(\sigma_{allow})_C = 80$  MPa? [Secs. 6.3 & 6.4] (20 pts.)
- 5) At section  $l-l$  in the beam shown in Fig. P5, determine: [Secs. 6.3 & 6.4] (30 pts.)
  - a) the total normal force acting on the shaded area of the flange
  - b) the total normal force acting on the web
  - c) the total normal force acting on the cross section (comment on the answer)
  - d) the moment of the forces about the N.A. (comment on the answer).

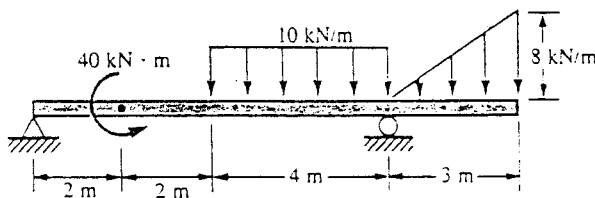
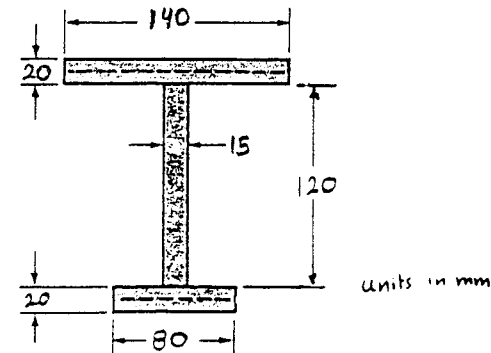


Fig. P1

beam



cross section

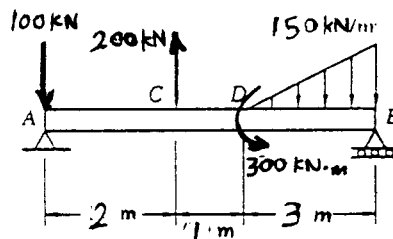
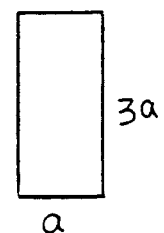


Fig. P2

Beam



x-section

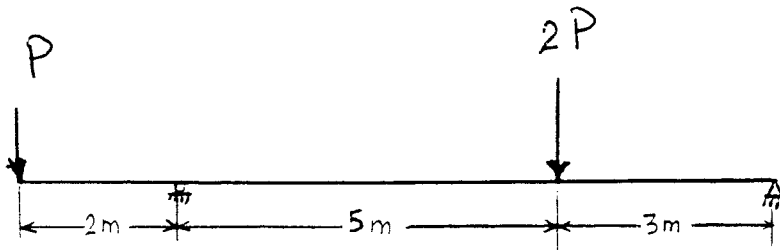
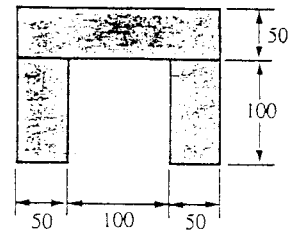


Fig. P3

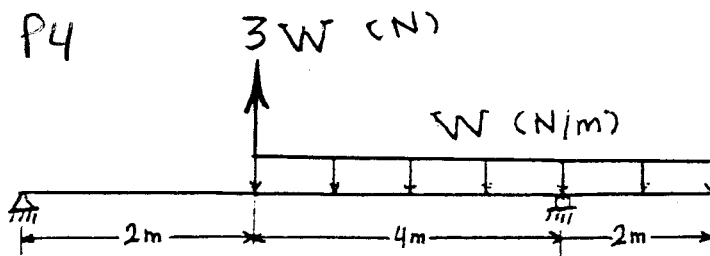
beam



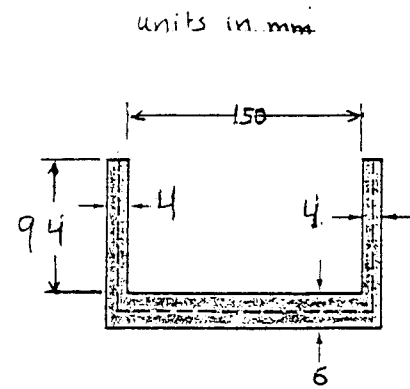
All dimensions in millimeters

Cross section

Fig P4

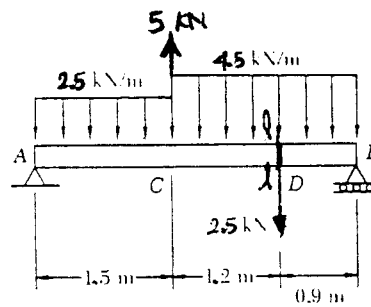


beam

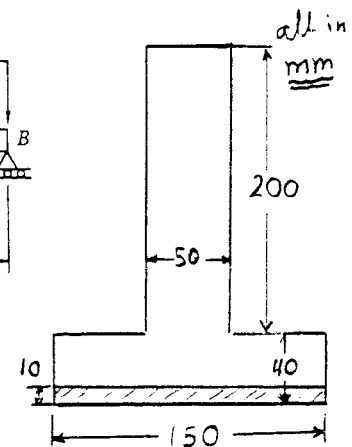


Cross section

Fig. P5



Beam



X-sec.

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. FOLLOW ALL THESE GUIDELINES. Cheating, copying, etc. is .....!!!!!!