Department of Mechanical Engineering
2.001 Mechanics and Materials I
Fall 2006

Problem Set 3

Distributed: Wednesday, September 27, 2006
Due: Wednesday, October 4, 2006

Problem 1: For the beam shown below, find the internal forces and moments as a function of position on the beam. (Consider both branches of the beam.) Plot your results, and explain why they make sense. (Note: you calculated the reactions at the supports for this structure on pset 1. You may use those results in this problem rather than recalculating them, but you would be well advised to first make sure that your results were correct.)
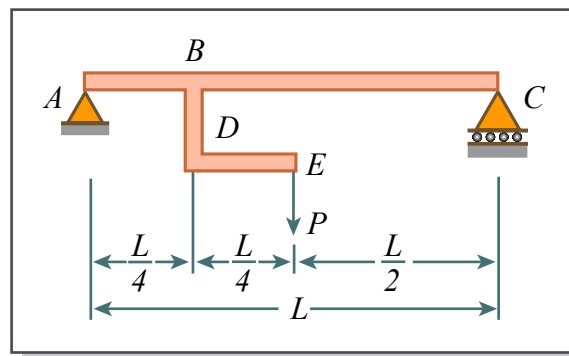

Figure by MIT OCW.

Problem 2: For both of the beams in the structure shown below, find the internal forces and moments as a function of position along the beam. Plot your results, and explain why they make sense. (Note: you calculated the reactions at the supports for this structure on pset 1. You may use those results in this problem rather than recalculating them, but you would be well advised to first make sure that your results were correct.)
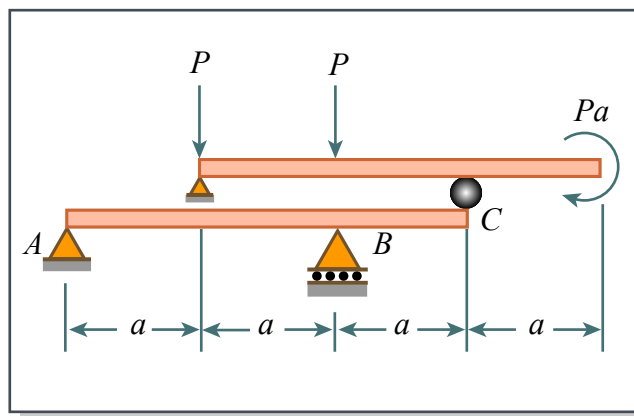

Figure by MIT OCW.

Problem 3: Crandall, Dahl and Lardner (CDL) 3.9

Problem 4 (based on CDL 3.13): Determine all of the internal forces and moments acting at sections 1, 2, and 3 in the member shown below. Plot your results, and explain why they make sense.
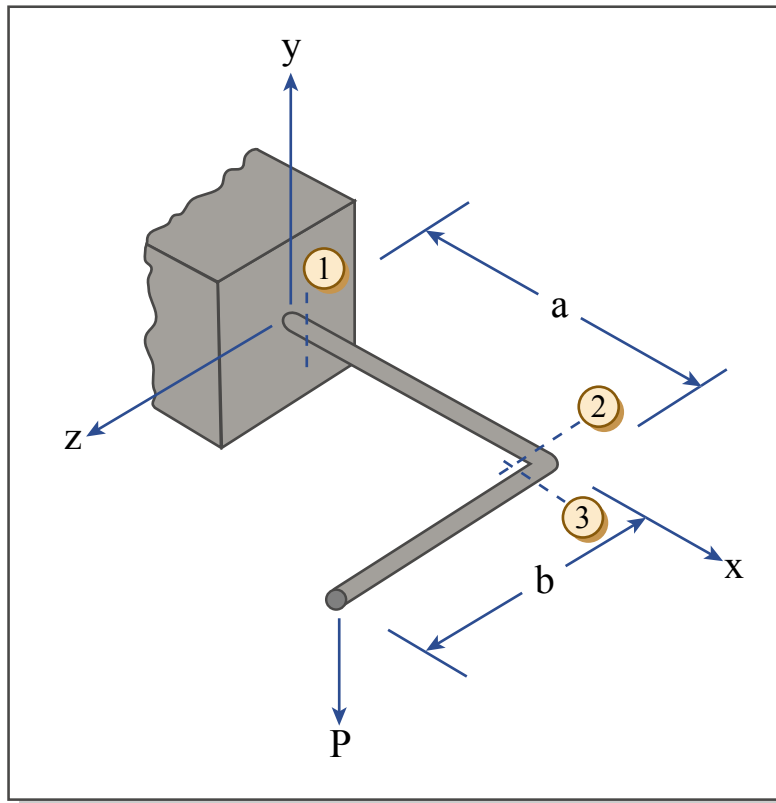
Problem 5: Do Hibbeler's problem 6.11.

Problem 6: Do Hibbeler's problem 6.32. In the process, also find the expressions for the internal forces and moments as a function of length along the ski. Please remember to work symbolically until the very end.

Problem 7: In this problem, several loaded structures are drawn, each with shear force and bending moment diagrams. Some of these might be correct, and some of them might be wrong. You are NOT being asked to calculate the internal forces and moments for these structures. You are simply being asked to do "sanity checks". For each loading condition, point out what (if anything) is wrong with the diagrams, explain in words why it is wrong, and sketch a replacement diagram if one is needed.

a)

b)

c)