King Fahd University of Petroleum & Minerals

CIVIL ENGINEERING DEPARTMENT

CE 203 STRUCTURAL MECHANICS I

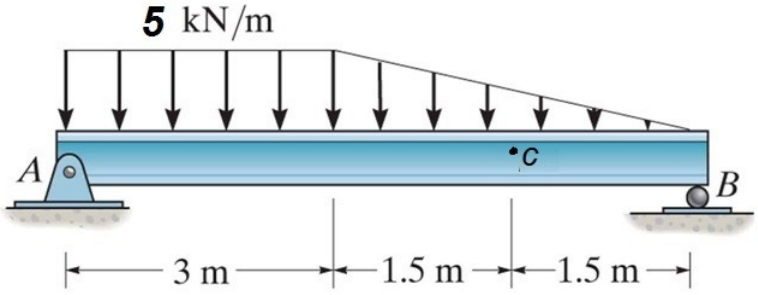
First Semester 2012 / 2013 (**121**)

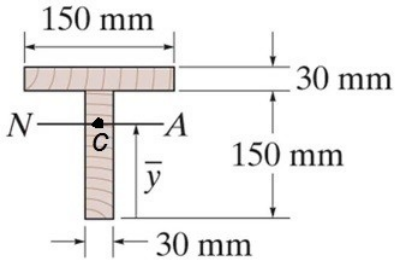
HOMEWORK NO. 10

- **Textbook Sections Covered: 6.3 – 6.4 , Beam Bending**
- **DUE DATE: Monday, 26 November 2012**

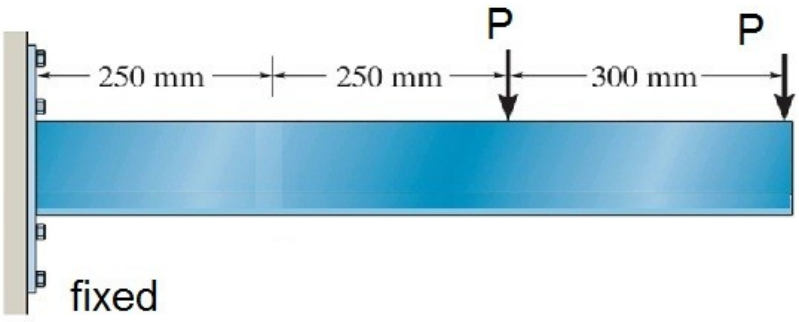
1- Solve problem **F6-18** in the textbook (page 293).

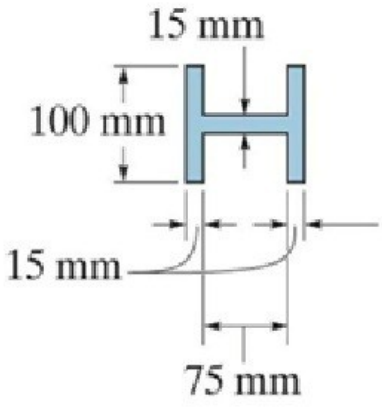
2- For the given beam and cross section, determine the stress at the top and bottom, and plot the distribution of the stress along the vertical axis. *(Hint : First, determine the support reactions and make a section at c to determine the internal moment **M** at that specific location).*





3 - The given beam with 2 loads has the shown H-shaped cross section. If the ultimate stress for the material is 180 MPa and a safety factor of 3 is used, a) determine the largest value of ***P*** that can be used safely (cross section has H shape) , b) determine the largest value of ***P*** that can be used safely, if we rotate the cross section by 90 degrees (cross section has I shape) , c) Compare the answer of part (b) to that in part (a) to decide which of the 2 positions is "better".





4 – For the given beam cross section, if the allowable tensile stress is 40 MPa , and the allowable compressive stress is 70 MPa, determine the magnitude of the maximum ***positive moment*** that can be safely applied. Then, determine the magnitude of the maximum ***negative moment*** that can be safely applied.