

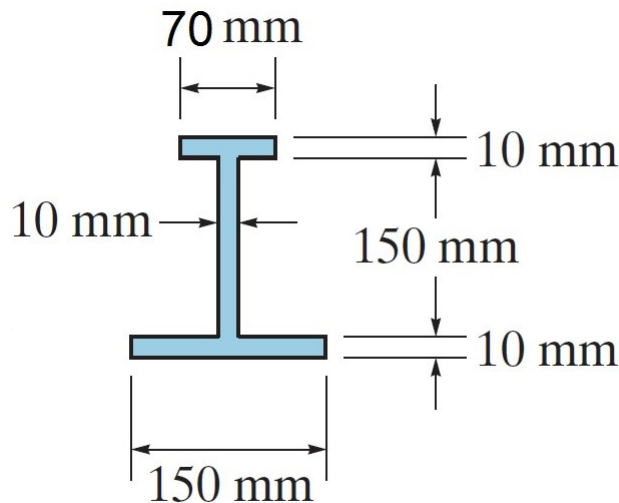
CE 203 STRUCTURAL MECHANICS I

First Semester 2012 / 2013 (121)

HOMEWORK NO. 11

- **Textbook Sections Covered:** 6.4 (Beam Bending) & 7.1-7.2 (Shear Stress in Beams)
- **DUE DATE:** Monday, 3 December 2012

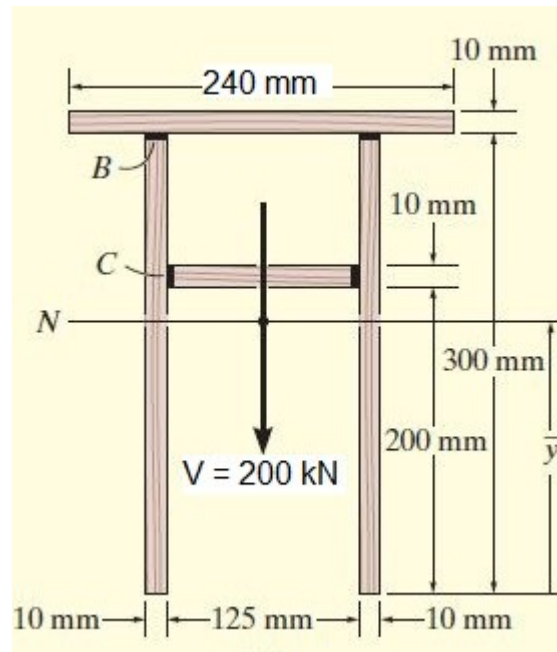
1 – The given cross section is subjected to a bending moment $M = +4\text{kN.m}$. Determine the resultant force (due to bending) that act on each of the following parts : a) on the top flange, b) on the bottom flange , c) on the web.



2 - The cross section shown above (Problem 1) is subjected to a downward vertical shear force $V = 10\text{ kN}$.

Calculate the value of the shear stress at the following locations: a) top of cross section , b) bottom of cross section , c) at the Neutral Axis, d) at just above and just below the junction of web and top flange (2 values are needed here), e) at just above and just below the junction of web and bottom flange (2 values are needed here) . Use the calculated stress values to sketch the distribution of shear stress along the vertical axis.

3 – For the given cross section, determine the value of the maximum shear stress due to the given shear force.



4- The given beam is loaded as shown and has the given cross section. Determine the largest value of the distributed load w that can be safely applied. Given: allowable normal stress is 30 MPa, and the allowable shear stress is 10 MPa. (Hint : First, you need to draw the shear and moment diagrams to determine the maximum values of V and M).

