

CE 203 STRUCTURAL MECHANICS I

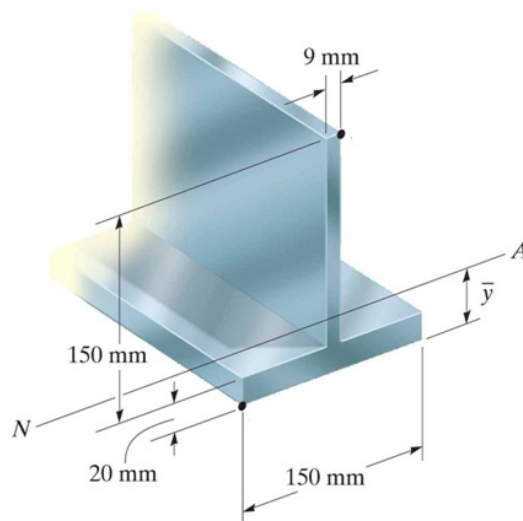
Second Semester 1433 / 2012 (112)

HOMEWORK NO. 11

- **Textbook Sections Covered:** 6.4 (Beam Bending) & 7.1-7.2 (Shear Stress in Beams)
- **DUE DATE:** Monday 23 - April - 2012

1– The given cross section is subjected to a bending moment $M = +5 \text{ kN.m}$.

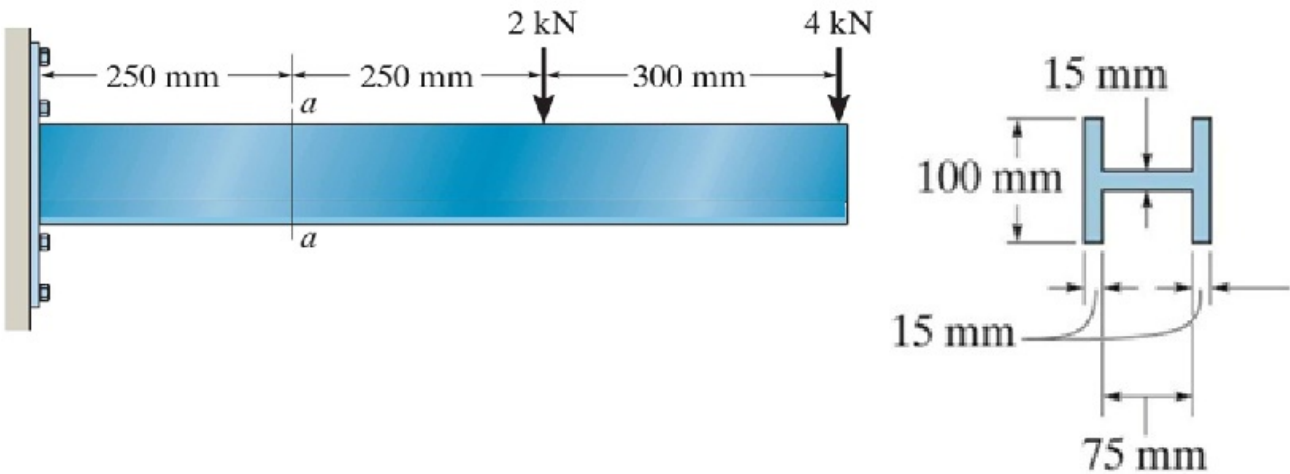
- Determine the *normal* stress at the top and bottom of the flange , and use them to calculate the resultant force on the flange.
- Determine the *normal* stress at the top and bottom of the web , and use them to calculate the resultant force on the web.



2- The same cross section shown above (Problem 1) is subjected to a downward vertical shear force $V = 80 \text{ kN}$. Calculate the value of the shear stress at the following locations : top of cross section , bottom of cross section , at the Neutral Axis, at just above and just below the junction of web and flange (2 values are needed here). Use the calculated stress values to plot the distribution of shear stress along the vertical axis.

3- Solve problem 7.14 in the textbook, but change the thickness of the 2 flanges from 12 mm to 15 mm.

4- Determine the shear stress at the Neutral Axis for the shown location (section $a-a$). Also , for the same $a-a$ location, determine the maximum shear stress.



5- For the given beam, determine the shear stress at point C , which is located on the Neutral Axis, 1.5m from the support at B.

