

**CE 203 STRUCTURAL MECHANICS I**

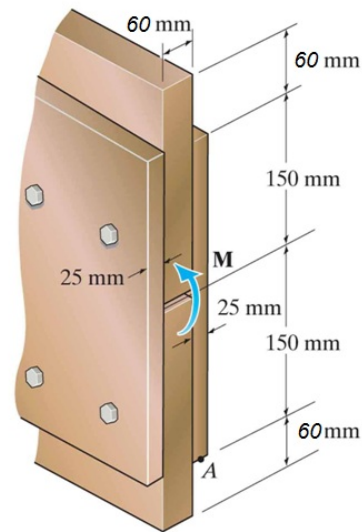
Second Semester 1433 / 2012 (112)

**HOMEWORK NO. 10**

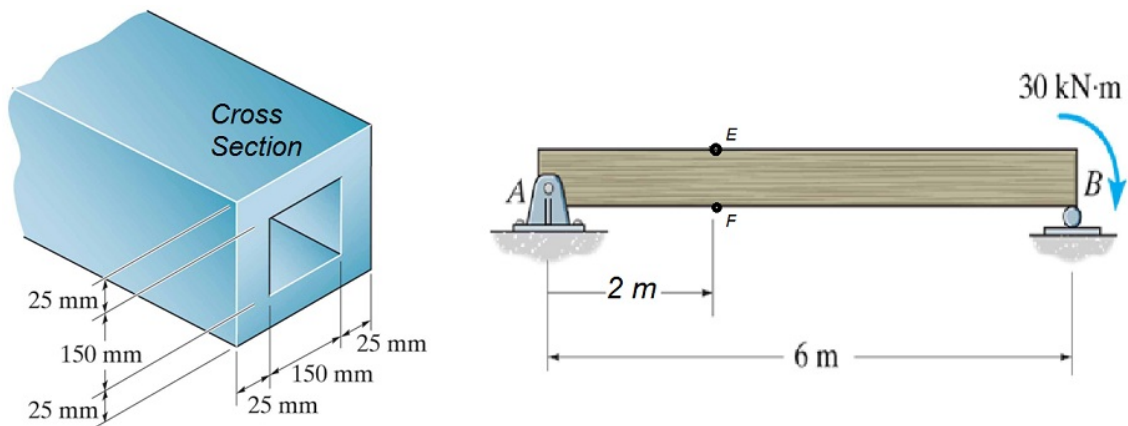
- **Textbook Sections Covered:** 6.3-6.4, Beam Bending
- **DUE DATE:** Monday 16 - April - 2012

1- Solve problem 6-49 in the textbook, but change the magnitude and direction of the given moment from +6 kN.m to -10 kN.m. ). Also, plot the distribution of the stress along the vertical axis  $y$ .

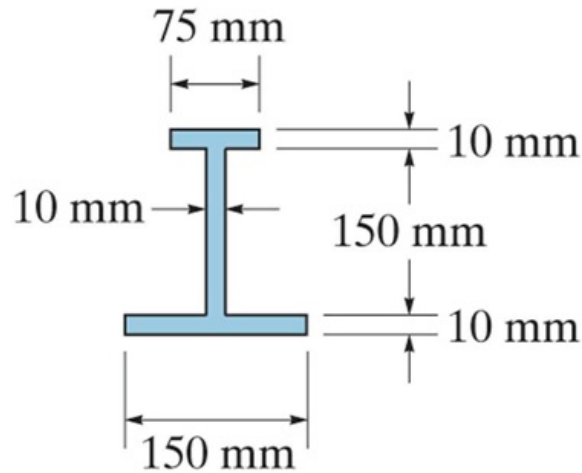
2- For the given beam cross section, determine the stress at the top and bottom, also plot the distribution of the stress along the vertical axis  $y$ . Use  $M = +8$  kN.m.



3- For the given beam, determine the stress at the top (point E) and bottom (point F) at the shown location (i.e. 2m from A).



4- For the given beam cross section, if the allowable tensile stress is 50 MPa , and the allowable compressive stress is 80 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.



5- The given beam has a square cross section, (  $a \times a$  ) , and is subjected to the given loads. If the ultimate stress for the material is 300 MPa and a safety factor of 3 is used, determine the smallest dimension “ $a$ ” that can be used safely.

