



CIVL3206 Steel Structures 1: Semester 2, 2006

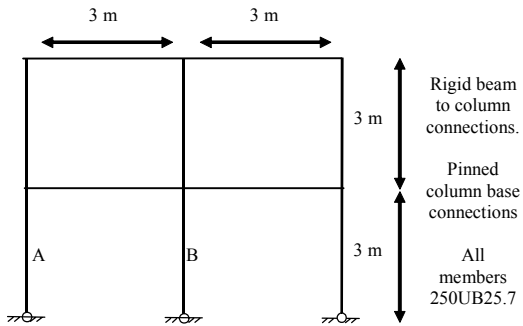
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Name: \_\_\_\_\_ Student Number: \_\_\_\_\_

- 1) (5 Marks) A truss will be constructed with T-sections as the chord members and double equal angle sections as the diagonal members. The angles will be welded on both sides of the web of the T section.
- Sketch the end conditions (section) for the diagonal member, and give the value of the correction factor  $k_t$  that would apply for the tension design of the diagonals.
  - Given that each angle section is 40 x 40 x 5 EA in Grade 300 steel, what is the design section capacity in tension ( $\phi N_t$ ) of the pair of angles

- 2) (5 marks) Consider a 250UB37.3 section in Grade 300 steel
- Determine the design section capacity ( $\phi N_s$ ) and the design member capacity for axial compression ( $\phi N_{cx}$ ) assuming buckling about the x axis with an effective length  $L_{ex} = 5.4$  m.
  - What effective length for y axis buckling ( $L_{ey}$ ) gives the same answer for  $\phi N_{cy}$  as for that calculated above for  $\phi N_{cx}$ ?

- 3) **(5 marks)** The diagram below shows the elevation of a steel frame in which the webs of all members are in the plane of the frame. For in-plane buckling of the columns, calculate the effective length of Column B.



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- 4) **(5 marks)** Explain the significance of the term  $\alpha_b$  in the calculation of the member capacity in compression. What does it account for? Why are there different values of  $\alpha_b$  for different section types?