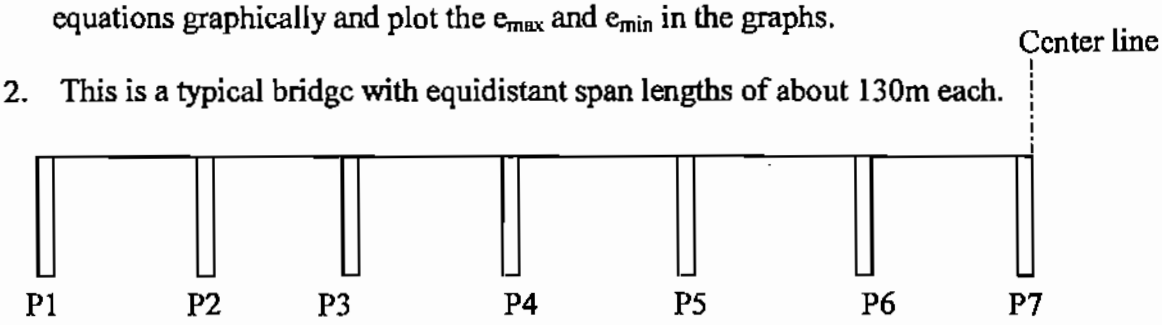
Major Exam CEL729 2006

1. A Post tensioned prestressed beam of 2500mm width and 600 mm width. The UDL is 12 kN/m and two-point load of 20kN eaeh at *l*/3 and 2*l*/3. The allowable eompressive stress is 17Mpa and allowable tensile stress is 1.5 Mpa. The losses may be assumed to be 15%. 50

   a) Calculate the maximum allowable eccentrieity and minimum prestressing force(after initial losses) at transfer.

   b) The prestressing force after initial losses are 1200 kN.
   Solve the problem for allowable eccentricity e_{max} and e_{min} analytically. Plot these equations graphically and plot the e_{max} and e_{min} in the graphs.

2. This is a typical bridgc with equidistant span lengths of about 130m each.



   a) What are the different live loads that are used (most important 3). 30
   b) Explain which of them is likely to be not governing.
   c) In casc this bridgc is a 4 lane bridge, what load combinations would you consider?
   d) I have to find maximum bending moment at the center point between P2 and P3. Whcre should I place the live loads? Draw the nccessary influence line diagrams.

3. There are two three-lane bridges – span of 120m and 15 m respectivcly. What typc of modeling will you do? Explain the two methods. 10

4. For a Typical bridge, what are the different loads that have to be considered for the superstructurc? 10