Question (1) The floor system of a shopping centre is as shown. The floor beams support 10 cm RC slab with floor cover of 150 kg/m^2 and live load of 400 kg/m^2.

It is required to

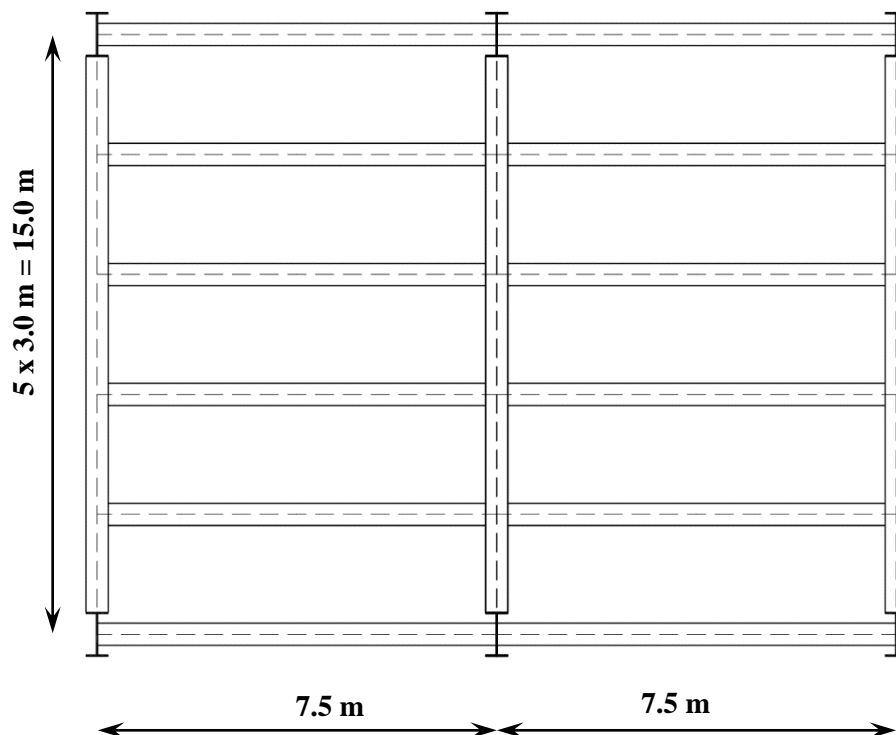a) Design both the main and secondary beams for the following two cases:

      Case 1: secondary beams are simply supported over the main beams.

      Case 2: secondary beams are continuously supported over the main beams.

b) Design the connections between

      (1) the secondary beams and main beams for the two cases

      (2) the main beams and columns

Question (2)

    a) Calculate and plot the relationship between the allowable stress (F_{ltb1}, F_{ltb2}, and F_b) and the unsupported length for the following sections:

        (1) HEB 300   **(2)** IPE 300   (Assume $C_b=1$)

    b) Based on point a, for a simply supported beam with cross section of IPE 300 and span of 8.0 m, determine its moment capacity if the beam is:

        (1) Laterally unsupported

        (2) Fully laterally supported

        (3) Laterally supported at mid-span

    c) Explain the effect of the flange width and the unsupported length of beams on their moment capacity.