Assignment-4 **CVEN3303** **Due date/time: 06/06/2016, 5:00 pm**

QUESTION 1 **(Moment amplification δ_m)** **(35 Marks)**

For the frame and design loads shown in Figure-1, determine the moment amplification factor δ_s for all of the columns. The Beams are **310UB32** and the columns are **310UC96.8**. All beams are rigidly connected to the columns. The column-to-footing connection is pinned. All beams and columns are bending about their major axis.

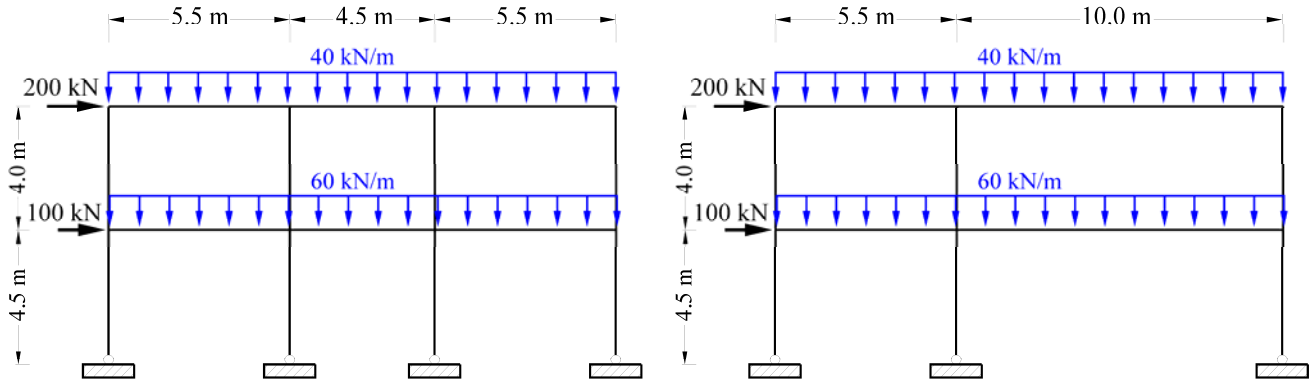
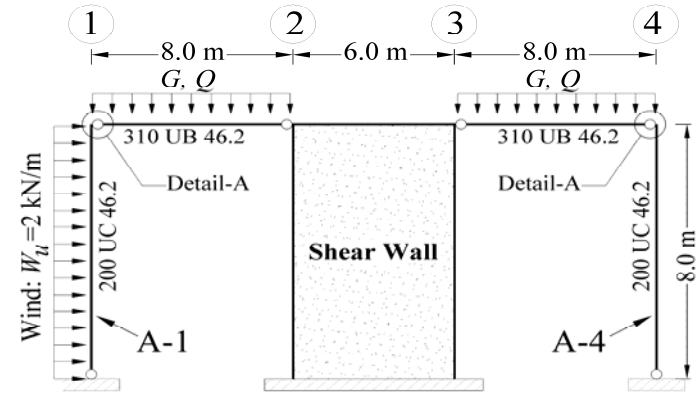


Figure-1

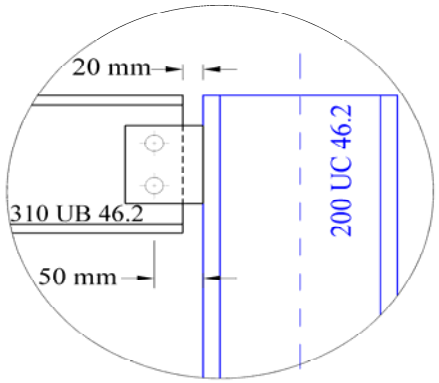
QUESTION 2 **(Design of beam-columns)** **(65 Marks)**

Check the adequacy of **200UC46.2, Grade 350** for column (A-1) and (A-4) shown in Figure-2. Ignore the Self-weight of the beams and columns. All beam-to-column and beam-to-shear wall connections in East-West direction and in North-South direction are hinge. All column-to-footing connections are pinned. All columns are fully restrained only at the base and top of the second storey (roof level). A uniform distributed permanent action (Dead Load) of G=20 kN/m and imposed action (Live Load) of Q=10 kN/m is acting on all beams in East-West direction and a uniform distributed wind load of W_u=2 kN/m is acting on the flange of column (A-1) as shown in Figure-2. Details of simple connections in East-West direction are given in Figure-2. **The minimum eccentricity requirement according to clause 4.3.4, AS4100 for simple connections only in East-West direction should be considered.**

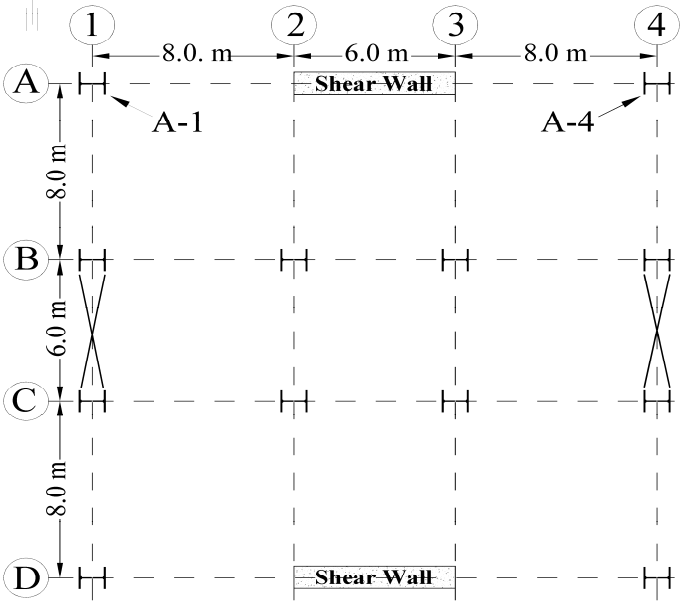
Note: The columns are subject to axial compression and uni-axial bending about their major axis.



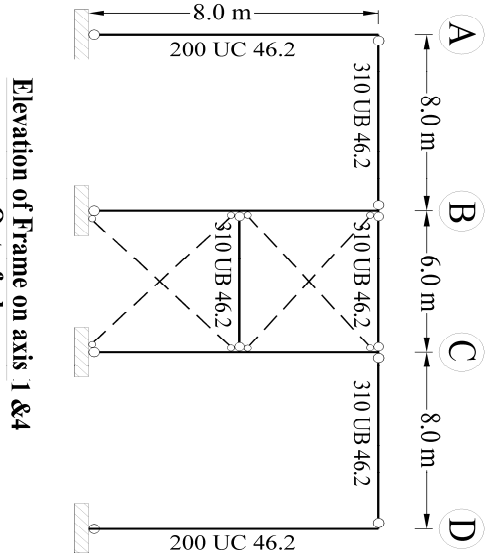
Elevation of Frame on axis A&D
In-plane



Detail-A
Beam-to-column connection



Plan (column orientation)



Elevation of Frame on axis 1 &4
Out-of-plane

Figure-2