

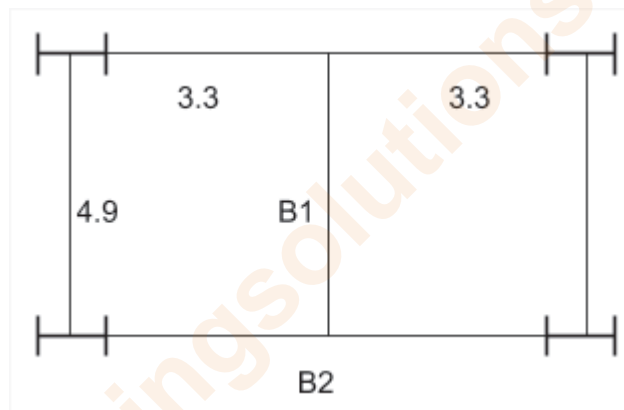
(4 Hr)

Maximum Marks - 80

- N.B.**
1. Question No.01 is compulsory, attempt any **three** out of remaining questions
 2. Draw neat and proportionate **sketches** whenever necessary.
 3. Use of **IS 800:2007 and steel table** is permitted.
 4. Assume **suitable data** if necessary and justify the same.
 5. Use steel of **Grade Fe410** and bolt of **grade 4.6**

Q.1 Design **Beam B1 and B2** using ISMB section and **beam to beam connection**, assuming top flange of beam embedded in slab. The flooring plan is as shown, Design flooring system for following data, provide cover plates to Beam B2 if Necessary

- Thickness of Slab - 15cm
- Thickness of wall - 230mm
- Height of wall over all beams - 1.3m
- Unit weight - (Concrete-25 N/mm³ , Brick Wall - 20 N/mm³)

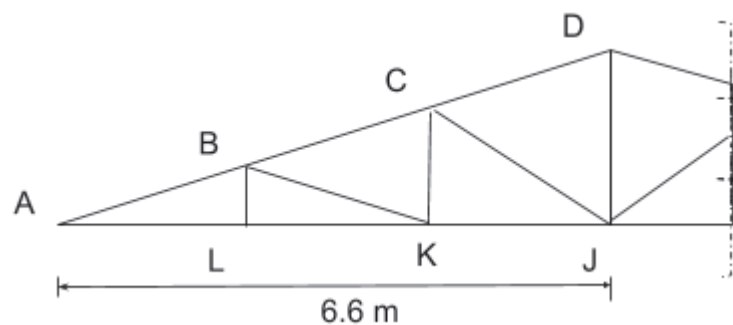


OR

Q.1 Find panel point load for given roof truss for DL,LL and WL and design member AB,AL and BL. the structure is situated in Mumbai industrial area with rise $\frac{1}{3}$.

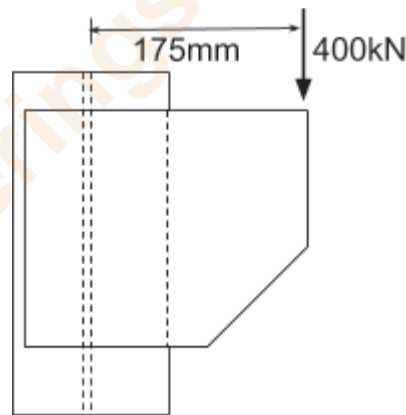
- Spacing between trusses - 3m,
- Span of truss - 13.2m
- Self weight of Purlin - 220 N/m
- wt of GI sheets - 150 N/m²

The values of $K_1 = 1.0$, $K_2 = 0.98$, $K_3 = 1.0$ and $(C_{pe} - C_{pi}) = -0.3$,



Turn over

- Q.2 a) Design a **built-up column** with two channel sections which are placed face to face to support factored axial compressive load of 1700 kN, If the effective length of column is 6.2 m, Design appropriate section, spacing between channel and suitable bolted lacing system for $d=20\text{mm}$. **10**
- b) **Design a column** using ISHB Section. Column is of length 4.2m supports factored load of 700kN, the column is effectively held in position and direction at both the ends. **06**
- Q.3 a) A Column ISHB 300@576.83 N/m strengthened with two cover plates of size 350 x 20mm to carry factored axial load of 2000kN, calculate Size, Thickness and number of bolts required for the **Gusset base** assuming M20 concrete grade and 24mm bolt diameter, draw diagrams showing all details. **10**
- b) A column is Consisting of ISHB 300@576.83 N/m carries axial factored load of 800kN, Design a **Square and Rectangular slab base** considering M15 concrete grade . Comment which one is economical. **06**
- Q.4 a) A column of ISHB 150 @ 300N/m carries factored end reaction of 400kN due to a Beam. **Design bolted bracket connection** with an eccentricity of 175 mm from web of column, the thickness of bracket plate is 12mm, and diameter of bolts is 24mm. **08**



- Q.5 b) A ISLB 350 @486 N/m used to design a laterally unsupported beam with length of 3.0m, Determine design bending strength (M_d) by using IS code table, also determine **safe UDL** that can be applied over beam. **08**
- a) A simply supported **welded plate Girder** of span 26m is subjected to UDL of 50 kN/m over the span excluding self weight, Design cross section, give check for shear buckling and design bending strength, also provide 2-step curtailment assuming plate girder is laterally supported throughout and no intermediate stiffeners are provided. (No need to design welded connections and stiffeners) **16**
