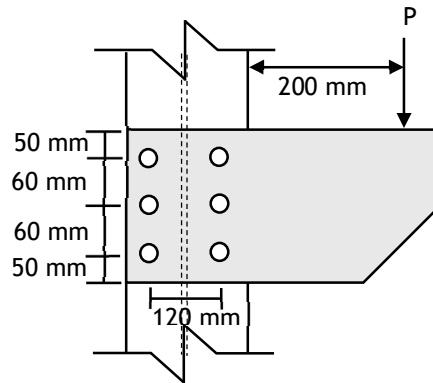


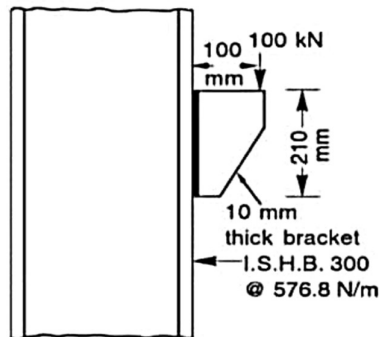
**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. IS800:2007 code is allowed in the examination hall.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

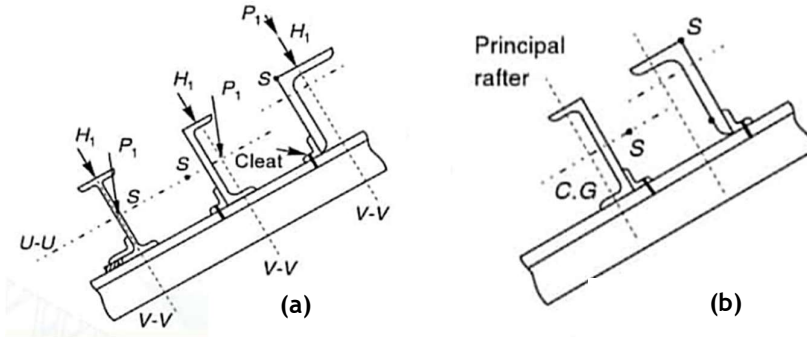
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|--------|--|-----|------------------|
|        |  | CO  | BL               |
| Q.1(a) | Write down the differences between a moment-resisting connection and a shear-resisting connection. Clearly highlight the deflection characteristics of the two systems.  | [2] | 1 K1             |
| Q.1(b) | Draw the schematic diagram of a bracket connection for (i) in-plane bending and (ii) out of plane bending condition. Highlight the type of stresses developed in each case.  | [3] | 1 K1             |
| Q.2(a) | Determine the safe load P that can be carried by the bolted connection shown in the figure. The thickness of the column flange is 9.1 mm, and the thickness of the bolt is 8 mm. Consider 4.6 grade bolt with diameter 20 mm. Consider $f_u = 410$ MPa and $f_{ub} = 400$ MPa. | [5] | 1 K1<br>K2<br>K3 |



- |        |   |     |                  |
|--------|---|-----|------------------|
| Q.3(a) | A 10 mm thick bracket is connected to transmit a factored reaction force of 100 kN acting at an eccentricity of 100 mm from the column flange as shown in the figure. Design the connection considering a fillet weld connection. | [5] | 1 K1<br>K2<br>K3 |
|--------|---|-----|------------------|



- Q.4(a) Define shear center of any section. For which cases, the concept of shear center is specifically important concerning to design of steel structures. [2] 1 K1
- Q.4(b) Among the following two configurations which one is recommended for placement of purlin sections on the rafter. Justify your answer. [3] 1 K1  
K2



- Q.5(a) Determine the factored load and moment acting on a purlin of an industrial factory shed. Draw a clear schematic diagram of the loading directions acting on the purlin section (Assume a channel section). The details of the problem are as follows. [5] 2 K1  
K2  
K3
1. Spanning of Truss = 3 m
  2. Inclination of Roof =  $30^\circ$
  3. Spanning of Purlin = 2.5 m
  4. Area load of roof coverage =  $210 \text{ N/m}^2$
  5. Dead Load of Purlin =  $100 \text{ N/m}$
  6. Wind Pressure =  $1.6 \text{ kN/m}^2$
  7. Assume continuous beam assumption while calculating the moment

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