


<b>Name:</b> <b>Enrolment No:</b>	
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**UPES**  
**End Semester Examination, May 2024**

<b>Course: Design of Steel Structures</b> <b>Program: B.Tech. Civil Engineering</b> <b>Course Code: CIVL4034P</b>	<b>Semester: VIII</b> <b>Time: 03 hrs.</b> <b>Max. Marks: 100</b>
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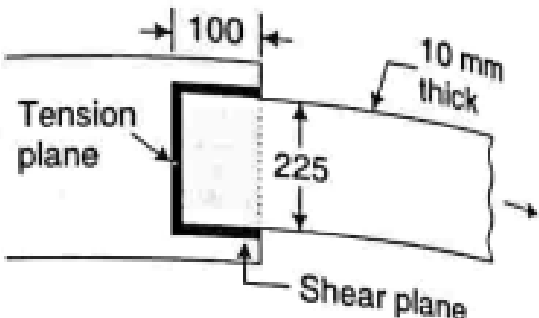
**Instructions:**

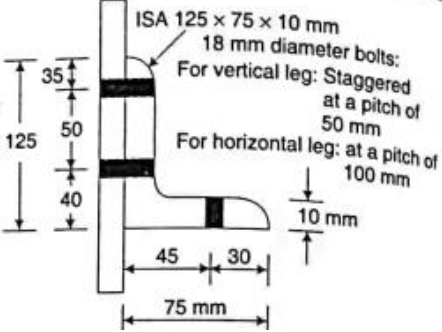
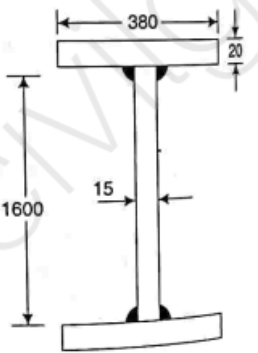
1. Use of the code IS 800 is permitted in the examination.
2. Use of the SP (6) – 1 (1964) or steel table of any standard publication is permitted in the examination.
3. Assume any missing data suitably.

**SECTION A**  
**(5Qx4M=20Marks)**

S. No.	Question	Marks	CO
Q 1	Compare the advantages of welded connection over bolted connections.	4	CO1
Q 2	Discuss the modes of failure in a tension member.	4	CO2
Q 3	Explain the difference in behaviour of long and intermediate columns.	4	CO2
Q 4	Discuss the various classification of beam sections.	4	CO3
Q 5	Explain various design philosophies for design of steel structures.	4	CO1

**SECTION B**  
**(4Qx10M= 40 Marks)**

Q 6	<p>Determine the tensile strength of the member as shown in the figure below.</p> <div style="text-align: center;">  <p>(All dimensions in 'mm')</p> <p><b>OR</b></p> <p>Calculate the effective area of the tension member shown in the below figure.</p> </div>	<b>10</b>	<b>CO2</b>
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	 <p>(All dimensions are in 'mm')</p>		
Q 7	Design a stanchion 3.5 m long, in a building, subjected to a factored load of 550 kN. Both the ends of the stanchion are effectively restrained in direction and position. Use steel of grade E250.	10	CO3
Q 8	An ISA 100 x 100 x 6 is used as a strut in a truss. The length of the strut between the intersections at each end is 3.0 m. Calculate the strength of the strut if it is connected by one bolt at each end.	10	CO3
Q 9	<p>Determine bending capacity of the built-up beam shown in the figure below. Assume E250 grade of steel.</p>  <p>(All dimensions in 'mm')</p>	10	CO4
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			
Q 10	<p>Design a built-up column 10 m long with two channel sections placed toe-to-toe to carry a factored axial load of 1080 kN. The column is restrained in position but not in direction at both the ends. Provide single lacing system with bolted connections. Assume E250 grade of steel and bolts of grade 4.6.</p> <p style="text-align: center;"><b>OR</b></p> <p>Design a built-up column 10 m long to carry a factored compressive load of 1200 kN. The column is restrained in position but not in direction at both ends. Design the column with battens as connecting systems with bolted connections. Use two channel section back-to-back. Use E250 grade of steel.</p>	20	CO4

Q 11	Determine the design bending strength of a ISLB 350 @ 486 N/m considering beam to be laterally (a) supported and (b) unsupported. The design force is less than the design shear capacity of beam. The unsupported length of the beam is 3.0 m. Assume E250 grade of steel.	<b>20</b>	<b>CO3</b>
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