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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

B.Tech-VI Semester (CSE/IT/BT/ECE/CE)

COURSE CODE (CREDITS): 23B11CE612 (3)

MAX MARKS: 35

COURSE NAME: DESIGN OF STEEL STRUCTURES

COURSE INSTRUCTOR: Dr. KAUSHAL KUMAR

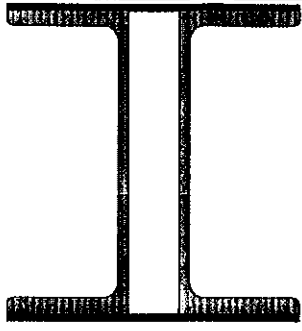
MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed, IS codes are allowed.

Q.No	Question	CO	Marks
Q1	An ISA 110 mm × 110 mm × 10 mm angle section is subjected to a factored tensile load of 150 kN and is connected to a 10 mm thick gusset plate. Design a bolted connection using High Strength Friction Grip (HSFG) bolts for the case: (a) Slip is not permitted at the service load, and Assume the structural steel used is of Fe 410 grade.		6
Q2	Two plates of thickness 12 mm and 10 mm are to be joined by a groove weld. The joint is subjected to a factored tensile force of 250 kN. Assuming an effective length of 150 mm, check the safety of the joint for <i>a) Single-V groove weld joint and,</i> <i>b) Double-V groove weld joint.</i> Assume Fe 410 grade steel plates and that the welds are shop welded.		6
Q3	A tension member 3 m long carries a factored tensile load of 250 kN. Design a suitable single angle unequal section when connection is made with 20 mm diameter bolts of grade 4.6. Assume longer leg to be connected with plate.		7
Q4	Design a laced column 10.5 m long to carry factored axial load of 1200 kN. The column is restrained in position but not in direction at both the ends. Use 2 channel section placed as back to back as shown in the figure.		7

			
Q5	A cantilever beam of length 4.5 m supports a dead load (including self weight) of 18 kN/m and a live load of 12 kN/m. Assume a bearing length of 100 mm. Design the beam.		6
Q6	What is a gantry girder? Explain its function and the loads acting on it in an industrial building (with the help of neat sketch).		3