JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-VI Semester (CE)

COURSE CODE (CREDITS): 18B11CE612 (3) MAX. MARKS: 35

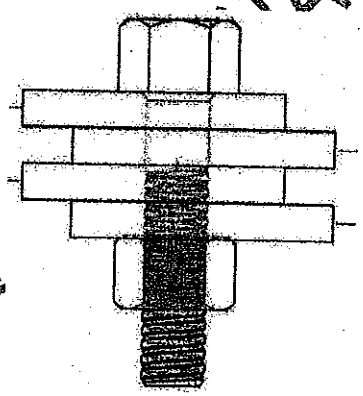
COURSE NAME: DESIGN OF STEEL STRUCTURES

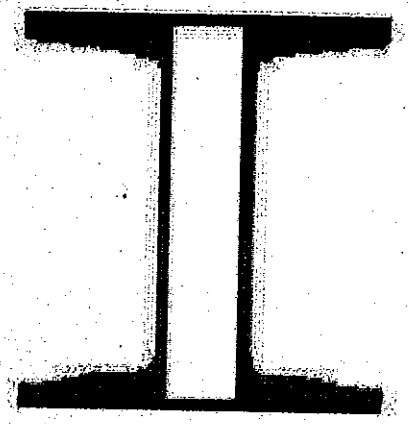
COURSE INSTRUCTORS: Dr. KAUSHAL KUMAR MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

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

(c) Scientific Calculator, IS800:2007, IS 808 or Steel Table is allowed.

Q.No	Question	CO	Marks
Q1	Discuss in detail about mechanical properties of Steel. Also Explain Residual Stresses and Stress Concentration in Steel design.	1	4
Q2	Calculate the shear strength of 16 mm diameter bolt of grade 4.6. The bolt is under triple shear as shown in the figure below. 	2	5
Q3	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 Single-V groove weld joint. Assume Fe 410 grade steel plates and that the welds are shop welded.	3	6
Q4	A tension member 3 m long carries a factored tensile load of 200 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.	3	6

Q5	Design a laced column 10.5 m long to carry factored axial load of 1000 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 below. 	4	7
Q6.	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. Check for web buckling and web cripling.	5	7