JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Supplementary Examination- 2026

B.Tech-VI Semester (CE)

COURSE CODE(CREDITS): 18B11CE612 (3) MAX. MARKS: 75

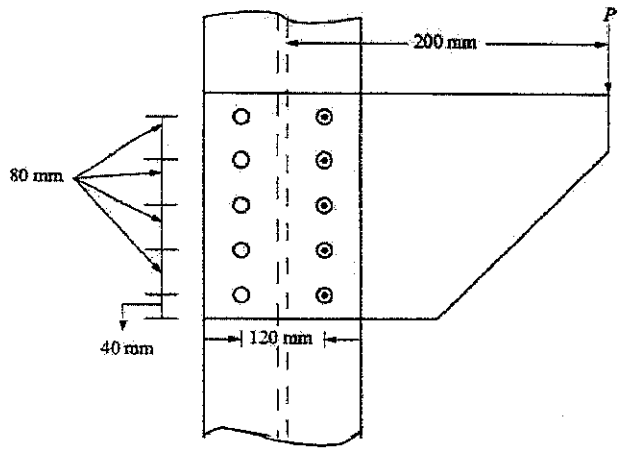
COURSE NAME: DESIGN OF STEEL STRUCTURES

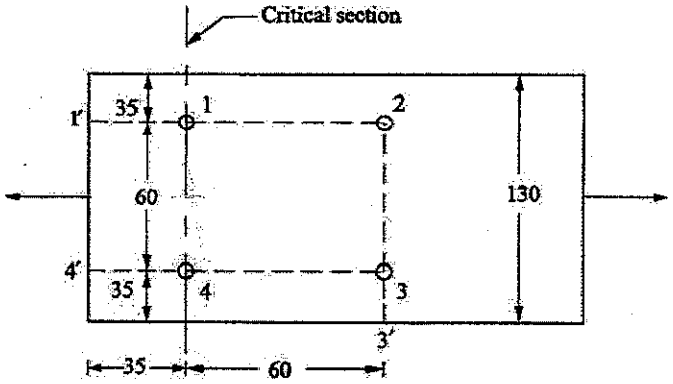
COURSE INSTRUCTORS: Dr. KAUSHAL KUMAR MAX. TIME: 2 Hours

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

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

(b) IS 800:2007, Steel Table or IS 808 and Scientific Calculators are allowed.

Q.No	Question	CO	Marks
Q1	Explain the special considerations in steel design with respect to (i) size and shape of members, (ii) buckling behavior, (iii) minimum thickness requirements, and (iv) connection design		**6**
Q2	Explain how limit state design differs from ultimate load design. Also, Distinguish between Characteristic loads and design (factored) loads.		**5**
Q3	Two plates 16 mm are to be joined using M20 bolts of grade 4.6 in (a) Lap joint. (b) Butt joint using 10 mm cover plates. Determine the bolt value. (Shearing Strength of the Bolt only)		**6**
Q4	Find the safe load P carried by the joint shown in Figure below. M20 bolts of grade 4.6 are provided at a pitch of 80 mm. The thickness of the flange is 6.1 mm and that of the bracket plate is 8 mm.  		**8**

Q5	Design a suitable longitudinal fillet weld to connect 120 × 8 mm plate to 150 × 10 mm plate to transmit a pull equal to the full strength of small plate. Assume welding is to be made in the field.		**8**
Q6	Determine the design tensile strength of the plate 130 mm × 12 mm with the holes for 16 mm diameter bolts as shown in Figure shown below. Steel used is of Fe 410 grade quality. 		**10**
Q7	Design a double angle tension member connected on each side of a 10 mm thick gusset plate, to carry an axial factored load of 375 kN. Use 20 mm black bolts. Assume shop connection.		**8**
Q8	Determine the load carrying capacity of a strut made with ISA 100x75x10 mm, if its length is 2.8 m in the following cases of end connections: (a) two bolts used.		**8**
Q9	An ISMB 150 is used as a column. The column has a height of 4.5 m. The ends may be assumed as hinged. What will be the allowable load on the column?		**8**
Q10	(a) Distinguish between laterally restrained and unrestrained beams, (b) With the help of a neat sketch, show different components and load on a gantry girder.		**8**

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