

R18

Code No: 156CY

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, February/March - 2022

STRUCTURAL ENGINEERING – II (STEEL)

(Civil Engineering)

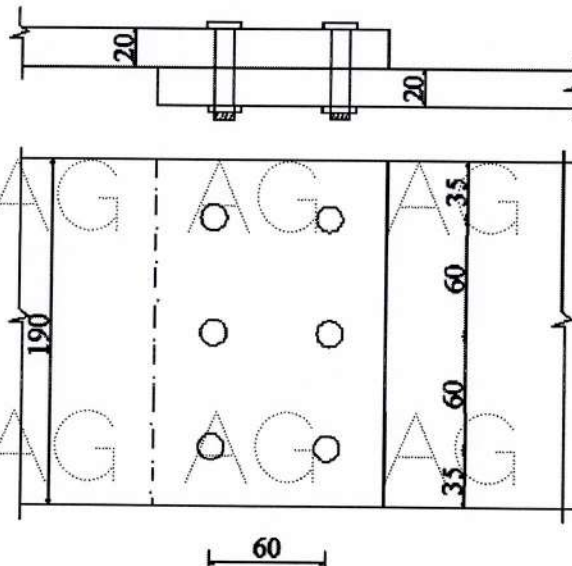
Time: 3 hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

Note: Use of IS 800:2007, IS 875 (part 3) and steel tables are allowed:

1. Find the efficiency of the lap joint shown in figure below. Given M20 bolts of grade 4.6 and Fe 410 plates are used. All dimensions are in mm. [15]



Dimensions in mm

2. Design a column 10 m height to carry a factored axial load of 1100 kN. The column is restrained in position but not in direction at both ends. Design a batten system for the column. Assume that the two channels are kept back to back. Sketch the details of the section. [15]
3. Estimate the suitable built up beam section for a span of 8 m to carry a uniformly distributed load of 15 kN/m and a central concentrated load of 100 kN. The beams are laterally supported through out. Show the curtailment of plates also. [15]
4. A plate girder of span 15 m is made-up of web plates of 1600 mm × 8 mm flange angles 150 mm × 115 mm × 10 mm and two flange plates 480 mm × 10 mm it carries a uniformly distributed load of 100 kN/m including its own weight. Design and sketch the web splices at 5 m from one end. [15]

5. Design a purlin on a sloping roof truss with the dead load of 0.15 kN/m^2 , a live load of 2.5 kN/m^2 and a wind load of 0.6 kN/m^2 (suction). The purlins are 1.8 m centre to centre and a span of 3.8 m , simply supported on a rafter at a slope of 20° . [15]

6. A beam ISWB 550 having equal flange width to that of column, transfers a factored end reaction of 275 kN to the flange of the column ISSC 250. Design the stiffened seat angle connection using 20 mm bolts of grade 4.6, $f_y = 250 \text{ MPa}$. [15]

7.a) Explain the Upper and Lower Bound Theorems.

b) Find the collapse load using (i) mechanism method, and (ii) statical method for the propped cantilever with UDL. [7+8]

8. An industrial roof shed of size $20 \text{ m} \times 30 \text{ m}$ is proposed to be constructed at Mangalore near a hillock of 160 m and slope is 1 in 2.8 . The roof shed is to be built at a height of 120 m from the base of the hill. Determine the design wind pressure on the slope. The height of roof shed shall be 12 m . [15]

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