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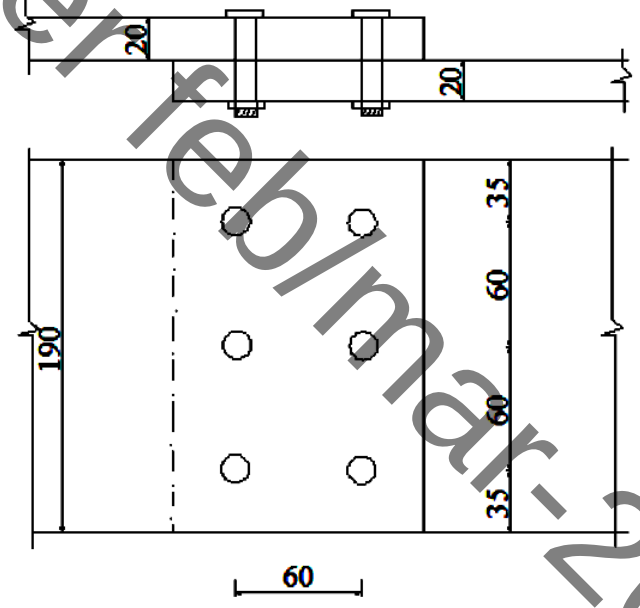
Note: Use of IS 800:2007, IS 875 (part 3) and steel tables are allowed:

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 1100kN. 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 8m to carry a uniformly distributed load of 15kN/m and a central concentrated load of 100 kN. The beams is laterally supported through out. Show the curtailment of plates also. [15]

4. A plate girder of span 15m is made-up of web plates of 1600mm × 8mm flange angles 150mm × 115mm × 10mm and two flange plates 480mm × 10mm it carries a uniformly distributed load of 100kn/m including its own weight. Design and sketch the web splices at 5m 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 1.8m centre to centre and a span of 3.8m, simply supported on a rafter at a slope of 20^0. [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, fy =250MPa. [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 m × 30 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 12m. [15]

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