

Code: 19CE3601

III B.Tech - II Semester – Regular Examinations – JUNE 2022**DESIGN OF STEEL STRUCTURES
(CIVIL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

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- Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
4. All parts of Question paper must be answered in one place.
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IS:800-2007 AND STEEL TABLES ARE PERMITTED

PART – A

1. a) Define (i) gauge distance (ii) staggered pitch.
b) Compare the advantages of welded connection over bolted connection.
c) List the various types of tension members.
d) Draw the lacing and batten of column with neat sketches.
e) What is meant by limit state design?

PART – B**UNIT – I**

2. Identify the number of bolts required for a lap joint between two plates of size 100mm x 16mm and 100mm x 12mm thick, so as to transmit a factored load of 120 kN using a single row of M20 bolts of grade 4.6 and grade 410 plates.

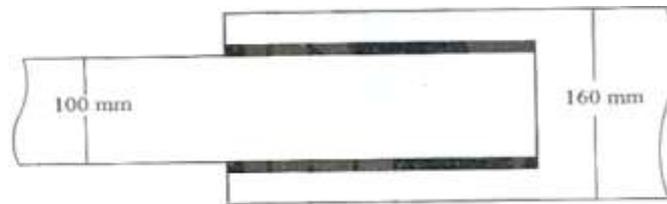
12 M

OR

3. Design a double cover butt joint to connect 2 plates of 12mm thick. Adopt power driven bolts. Take $f_y = 250\text{MPa}$. Find also the efficiency of the joint. 12 M

UNIT – II

4. Design a suitable longitudinal fillet welds to connect the plates as shown in fig. To transmit a pull equal to the full strength of small plate. Given: plates are 12mm thick, grade of plates Fe410 and welding to be made in workshop.



12 M

OR

5. Design a connection to joint two plates of size 200×10 mm of grade Fe410 to use full plate tensile strength using shop fillet welds. 12 M

UNIT-III

6. A single unequal angle ISA 9060, 6mm is connected to a 10mm gusset plates at the ends with 5nos.of 16mm bolts to transfer tension. Determine the design tensile strength of the angle.

a) If the gusset is connected to 90mm leg.

b) If the gusset is connected to 60mm leg.

12 M

OR

7. Design a horizontal tension member carrying a factored axial load of 600 KN, the length of the member is 3 m. The member is connected to 4.5 mm thick gusset plate with 20 mm bolts.

12 M

UNIT – IV

8. A rolled steel beam section ISHB 350 @ 0.674 kN/m is used as a stanchion. If the length of the stanchion is 4m and both ends are hinged, determine safe load carrying capacity of the section. 12 M

OR

9. Design a built-up column consisting of two channels connected by batten to carry an axial load of 800 KN; the effective length of the column is 6 m and both ends are hinged. 12 M

UNIT – V

10. Design a simply supported beam to carry uniformly distributed load of 44 kN/m. The effective span of beam is 8 m. The effective length of compression flange of the beam is also 8 m. The ends of beam are not to free to rotate at the bearings. The beam is laterally supported. 12 M

OR

11. Design rolled steel I-section for a simply supported beam with a clear span of 6m. It carries a UDL of 50 KN per meter exclusive of self-weight of the girder. The beam is laterally unsupported. 12 M