

SECTION - D

8. A purlin is to be designed to support a GI sheet as roofing material for a truss spaced at 3.5 m c/c. Purlin along the principal rafters are arranged at a distance of 1.35 m c/c. The pitch of truss is 0.2 m. Design a section for the purlin. Assume basic wind speed as 44 m/s. 15
9. (a) Explain in details design steps of bearing stiffeners. 5
- (b) Differentiate between welded and riveted plate girders. 10

Roll No.

3205

**B. Tech. 5th Semester (Civil Engg.)
Examination – March, 2021**

DESIGN OF STEEL STRUCTURE

Paper : PCC-CE-309-G

Time : Three hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any *five* questions. All questions carry equal marks. Question No. 1 is **compulsory**. Attempt *one* question from each Section. Assume suitable data where required or missing. Use of code IS 800-1984 and Steel Table is allowed.

1. (a) What is Necking of steel sections ?
(b) Write the formula to calculate the efficiency of Bolt Joint.
(c) List some of the pinned connection used in steel structures.

(d) State the possible failure modes of an axially loaded column.

(e) What is difference between lacing and battens ?

(f) What is difference between laterally restrained and un-restrained sections ?

(g) Define the term - Pitch of a rivet.

(h) Differentiate nominal diameter and gross diameter of bolt.

(i) What are the different types of bracings used in a braced building ?

(j) Write types of stiffeners.

$$1.5 \times 10 = 15$$

SECTION - A

2. The plates of a tank 8 mm thick are connected by a single bolted lap joint with 20 mm diameter bolts at 50 mm pitch. Calculate the efficiency of the joint. Assume Fe 410 plate and grade 4.6 bolts. 15

3. A double riveted cover butt joint is used for connecting two plates of 12 mm thickness. The joint is double riveted with cover plates each 8 mm thick. The load to be transferred by the joint is 500 kN. Design the joint and rivets on packing. 15

SECTION - B

4. Design a built up column with two channels placed back-to-back and separated apart. The column is of 6 m effective length and supports a factored load of 1500 kN. Also design the bolted lacing system. Assume $f_y = 250$ MPa. 15

5. (a) Differentiate between web buckling & web crippling. 5

(b) Write in details design procedure for gusset plate. 10

SECTION - C

6. An ISLB600@976.1 N/m has been used as a simply supported beam over a span of 7.2 m. Determine the safe uniform load that the beam can carry in flexure if the compression flange of the beam is restrained against lateral buckling. 15

7. A conference hall 8 m x 12 m is provided with a 120 mm RCC slab over rolled steel I beams spaced 4 m centre to centre. The super imposed load is 4 kN/m² and floor finish of 1.5 kN/m². Design one of the beam as laterally supported. 15