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Total number of pages:[2]

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B.Tech. || CIVIL || 5thSem

DESIGN OF STEEL STRUCTURE -I

Subject Code:BTCE-501

Paper ID:

Time allowed: 3 Hrs

Max Marks: 60

Important Instructions:

- All questions are compulsory
- Assume any missing data

IS 800-2007 code and Steel Tables for design of steel structures are permitted in exam.

PART A (10x 2marks)

Q. 1. Short-Answer Questions:

- (a) What is the difference in behavior of long and Intermediate Column?
- (b) How can you say that the smaller size fillet welds are preferred?
- (c) What is Inelastic buckling?
- (d) How does the Geometric Factor effect the strength of a Tension member?
- (e) How would you differentiate between bending and buckling of a beam?
- (f) What is the function of Rafter in the Roof truss?
- (g) What is the need to provide gusset base in the steel column?
- (h) Describe briefly the bracing system used in the Roof Trusses.
- (i) What is Shear Lag effect?
- (j) Describe briefly about the Tension member splice.

PART B (5x8marks)

Q. 2. Explain the following with neat sketches :

- a) Spacing of the roof truss.
- b) Bracing system in roof trusses.
- c) Connection of Purlin to Rafter.

CO1

OR

- a) Design a suitable base plate for a column section ISHB 350@661 N/m supporting an axial load of 350 KN. Use concrete of grade M25 for pedestal supporting the column.

CO1

Q. 3. Explain in detail the Step-wise procedure for the design of a column having double lacing system.

CO2

OR

Design a double angle Tension member connected on each side of a 12 mm thick gusset plate, to carry an axial factored load of 325 KN. Use 22 mm black

bolts. Assume shop connections.

CO2

- Q. 4. Design a Tension member with Channel section which is 5.2 m long and is required to carry a Tensile load of 555 kN. CO2

OR

A Column of 9 m effective length has to support an axial factored load of 1500 kN. Design the Column Which shall consist of two channels placed back to back at suitable spacing. Design also the single lacing system. CO2

- Q. 5. Explain the step wise procedure for the design of Gusset Base. CO4

OR

Design a beam of span 9 m carrying a uniformly distributed load of 15 kN/m. The depth of the beam is limited to 400 mm. Use steel of grade Fe 410. CO4

- Q. 6. An ISA 90 x 60 x 8 is required to be connected to 16 mm thick Gusset plate. Design a fillet weld to carry a force equal to strength of the material. CO3

OR

Design a Double cover butt joint to connect two plates each of size 400 X 70 mm through a lap joint. The load to be transferred through the plates is 190 kN under the working conditions. Bolts used are of 24 mm diameter and of grade 4.6. Steel used is Fe 410. CO3