

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

Dec.-22-0293

CE-701 (Limit State Design of Metal Structures)

B.Tech. 7th (CBCS)

Time : 3 Hours

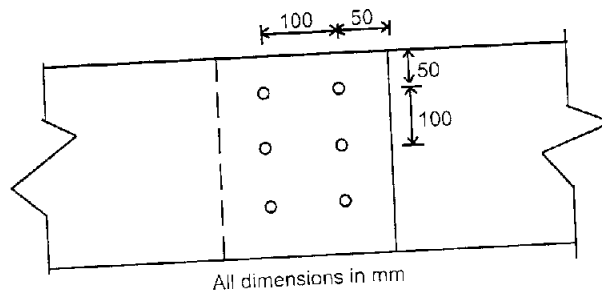
Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt four questions selecting one question from Section A, B, C and D. Section E is compulsory.

SECTION - A

- Explain the classification of cross sections as per the IS 800: 2007 based on yield and plastic moments & rotational capacities. (5)
 - A tie bar 100mm × 16mm is welded to another plate. It is subjected to factored pull of 320 kN. Find the minimum overlap required if 8mm site fillet welds are used. Assume any missing data. (5)
- Determine the strength and efficiency of a bolted lap joint shown in figure. The bolts are of 22mm diameter, grade 4.6. The plates are of 12mm thick and grade Fe410. (10)



SECTION - B

- Determine the design compressive strength of single angle discontinuous strut ISA 80 mm × 80 mm × 10 mm of length 2 m when connected to gusset plate through one leg by fillet welds at each end. Yield stress of steel used is 340 MPa. The gusset fixity may be taken as hinged. (10)
- Design a built up column with two channels placed back-to-back and separated apart. The column is of 6m effective length and supports a factored load of 1500kN. Also design the bolted lacing system. (10)

SECTION - C

- An ISLB600@976. 1N/m has been used as a simply supported beam over a span of 7.2m. Determine the safe uniform load that the beam can carry in flexure if the compression flange of the beam is restrained against lateral buckling. (10)
- Design a grillage foundation with 1-section, for a column having a load of 5000 kN. Column is provided with a base plate of size 700mm × 800mm. Take bearing capacity of the soil as 200 kN/m². Assume any missing data. (10)

SECTION - D

- Design the purlins of a truss. It is given that the length of the purlin is 5 m. The dead load, live load and wind load are 301.7 N/m, 620 N/m and 18373 N/m respectively. (10)
- Explain various loads and load combinations to be considered in the design of a roof truss. (5)
 - Draw a neat sketch for the steel roof truss showing its various components. Also explain any ten of its components. (5)

[P.T.O.]

SECTION - E (Compulsory)

9. (a) What is meant by shape factor of a section?
- (b) What is the difference between black bolts and HSFG bolts?
- (c) Sketch and briefly explain any three failure patterns of bolted connection.
- (d) Web buckling.
- (e) Fillet Weld.
- (f) Block Shear Failure.
- (g) Lug angles.
- (h) Ductility.
- (i) Strain hardening.
- (j) purlins. (10×2=20)