



c14-c-601

4716

BOARD DIPLOMA EXAMINATION, (C-14)

OCT/NOV—2017

DCE—SIXTH SEMESTER EXAMINATION

DESIGN OF STEEL STRUCTURES

Time : 3 hours ]

[ Total Marks : 80

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**PART—A**

3×10=30

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **three** marks.  
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.  
(4) Use of IS 800–2007, IS 875–1987 and steel tables are permitted.  
(5) Assume any suitable data, if necessary.

1. Write any six forms of rolled steel sections with diagrams.
2. Write any six advantages of welded joints.
3. Write the three different types of failures in tension members.
4. Why the strength of a tension member connected by fillet weld is more when compared to the strength of the member connected by riveted joints?
5. State the methods used to connected by riveted joints.

- \* 6. Define lacing and battening.
7. Draw the cross section of a welded plate girder and label the component parts.
8. Define plastic section modulus.
9. Define (a) plane truss and (b) space truss.
10. Calculate the live load on a truss if the angle of slope of roof is  $25^\circ$ .

**PART—B**

10×5=50

**Instructions :** (1) Answer *any five* questions.  
(2) Each question carries **ten** marks.  
(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. A tie member in a truss consists of a pair of angles 2 ISA  $100 \times 75 \times 10$  mm connected to a gusset plate of 12 mm thickness by shop fillet welds on both sides of the angle. Design the welded joint if the member carries a tensile load of 495 kN and ultimate stress in the fillet weld is 410 MPa.

12. Design a double angle tension member to carry an axial tension of 480 kN, using steel of yield stress  $250 \text{ N/mm}^2$  & ultimate stress  $410 \text{ N/mm}^2$ . The effective length of the member is 6 m. The angle are to be connected on either side of 12 mm gusset plate by fillet welds.

13. Design a slab base for a column ISHB 300 @ 577 N/m carrying an axial load of 1000 kN. M-20 grade concrete is used for the foundation. Yield stress of steel used is 250 MPa. Provide welded connections.

- \* **14.** What is a built-up compression member? Write any five design specifications for lacing as per IS 800 : 2007? Sketch single lacing system. 2+5+3
- 15.** Design a single angle, section to carry a compression of 100 kN. The c/c distance between the end connections is 2.2 m. Assume that the end connections is done by the fillet welds. The grade of the steel is 250 MPa.
- 16.** Determine the design bending strength of a laterally restrained beam ISMB 300 @ 442 N/m. The yield stress of steel is 250 MPa.
- 17.** Find the shape factor for I-Section with flange dimensions 250 mm × 15 mm and web dimensions 275 mm × 12 mm.
- 18.** Determine the design loads on the purlins of an industrial building near Vishakhapatnam, given :
- Class of the building : general with life of 50 years
  - Terrain : category 2
  - Maximum dimension : 40 m
  - Width of the building : 15 m
  - Height at eave level : 8 m
  - Topography : 0 till than 3°
  - Permeability : medium
  - Span of truss : 15 m
  - Pitch : 1/5
  - Sheeting : AC sheets
  - Spacing of purlins : 1.35 m
  - Spacing of trusses : 4 m

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