C09–C–**602**

3721

BOARD DIPLOMA EXAMINATION, (C–09)
OCT/NOV—2015
DCE—SIXTH SEMESTER EXAMINATION

STEEL STRUCTURES

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

Reference books to be allowed :

(1) Steel code IS 800–2007

(2) Steel tables

(3) Tables from IS 875–1987 for wind load calculations

1. Name any six forms of rolled steel sections.

2. Write any three advantages of welded joints over riveted joints.

3. Define a tie and mention different shapes of sections used as ties.

4. Write three different types of failures of a tension member.

5. Differentiate between lacing and battens.

6. What is meant by slenderness ratio?

7. Draw the cross section of plate girder and label the component parts.

8. Explain the terms :

   (a) Web crippling

   (b) Web buckling

9. What is a purlin? List various loads used in the design of a purlin.

10. Determine the live load per square metre of plan area of the pitched roofofslope 26°.

PART—B   10×5=50

Instructions : (1) Answer *any* **five** questions.

               (2) Each question carries **ten** marks.

11. A tie member of a roof truss consists of 2-ISA 100 mm 75mm 8 mm. The angles are connected to either side of a 10 mm gusset plate and the member is subjected to a working load of 300 kN. Design the side fillet weld only. Assume connections are made in the workshop.

    Take f_u 410 N / mm^2

12. Design a single-angle tension member to carry a factored load 340 kN. The angle is to be connected to a gusset plate with longer leg by fillet welds. Take f_y 250 N/mm^2, f_u 410 N/mm^2

13. Determine the design compressive strength of single ISHB 400 at 822 N/m when it is used as a column of 5 m height with both of its ends, restrained against translation and rotation. The yield stress of steel used is 340 MPa.

14. Design a slab base for a column ISHB 300 at 588 N/m carrying a factored load of 1500 kN. M 20 concrete is used for the foundation yield stress of the steel is 250 Mpa. Also design the concrete pedestal if the safe bearing capacity of soil is 190 kN/m^3.

15 *(a)* Explain any five codal provisions to be followed in the design of lacing system as per IS : 800-2007.   5

     (b) Draw a neat sketch (sectional elevation) of Gusseted base showing its components.   5

16. Determine the design bending strength of a laterally restrained beam ISLB 400 at 569 N/m. The yield stress of steel is 300 MPa.

17. Design a simply supported beam of an effective span 6 m carries a udl of 20 kN/m including self weight. If the compression flange of the beam is laterally restrained, check the beam for shear only. The grade of steel is Fe 410.

18. Determine the design loads on th nodal points of the truss of an industrial building near Visakhapatnam. The building is first class building with general life of 50 years; with the following data :

     Terrain category 2, Maximum dimension—40 m, width of building—15 m, height at eve level—8 m, Topography— slope less than 30°, 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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