3721

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2013

DCE—SIXTH SEMESTER EXAMINATION

STEEL STRUCTURES

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

PART—A

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

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

          (3) Use of IS-800 : 2007, IS-875 and steel tables permitted.

          (4) Assume suitable data, if necessary.

1. State the load combinations that are to be considered in the design of steel structures.

2. List out different types of welded joints.

3. How does block shear affect the strength of a tension member?

4. Draw different shapes of members used as Tie.

5. State the classification of cross-sections.

6. Write the equations of longitudinal shear and moments for which the battens are subjected at their ends.

7. Differentiate between elastic section modulus and plastic section modulus.

8. State the situations where the plate girders are necessary.

9. Sketch the roof truss and name the component parts.

10. Determine the live load on truss is considered in the design if the angle of slope of roof is 25°.

PART—B

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

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

11. An angle ISA 110 mm 110 mm 10 mm carrying an axial designed tension of 220 kN is connected to gusset plate of 12 mm thick by a lap joint using sides end welds. Design the joint. Take design shear stress in the fillet weld as 150 MPa.

12. Design a double angle tension member to carry factored tensile force of 300 kN. The angles are to be connected back-to-back on the same side of the gusset plate with their longer legs using fillet welds. Take f_y 250 MPa.

13. Two channels ISMC 300 @ 358 N/m are to be placed back-to-back and used as column an effective length of 6·0 m. Determine the minimum clear distance between backs of the channels. Also determine maximum designed strength of column. Take f_y 400 MPa.

14. Design a single angle discontinuous strut for a roof truss. The length of the member from center-to-center of fastenings is 3·0 m. Take f_y 250 MPa.

15. *(a)* Explain various 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 slab base showing its components. 5

16. Rolled steel-I section to be provided at 3m intervals to support RCC slab of 150 mm thick. The imposed load on the slab is 3 kN/m^2, weight of floor finishing is $1 \cdot 2 \text{ kN/m}^2$, the effective span of the beam is 7·2m. Design suitable beam. Take f_y 280 MPa.

17. Determine the design bending strength of a laterally restrained beam ISMB 300 @ 442 N/m. The yields stress of steel is 250 MPa.

18. A roof truss shed is built for an industry. The size of shed is 24m 40m. The height of the building is 12m at the eves. Determine the basic wind pressure. Also calculate wind load at all nodal points. Take basic wind speed as 47m/sec.

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