



c09-c-602

**3721**

**BOARD DIPLOMA EXAMINATION, (C-09)**

**MARCH/APRIL—2021**

**DCE - SIXTH SEMESTER EXAMINATION**

**STEEL STRUCTURES**

Time : 3 hours ]

[ Total Marks : 80

**PART—A**

4×5=20

- Instructions :** (1) Answer *any five* questions.  
(2) Each question carries **four** marks.  
(3) Any missing data can be suitably assumed.  
(4) Reference books : Steel code IS : 800-2007, Steel tables, Extracts from IS : 875-1987 for load calculation are allowed.
1. State the mechanical properties that are to be considered in the design of steel structures as per IS : 800-2007.
  2. State the different types of welded joint.
  3. Sketch any four types of section used for tension members.
  4. Write down the formula for calculation of design strength due to yielding of gross section ( $T_{dg}$ ) as per IS : 800-2007.
  5. Define slenderness ratio.
  - \* 6. What is the effective length for a column whose both ends are restrained against translation and rotation as per code?
  7. What is meant by a beam?
  8. State any four component parts of a plate girder.

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9. What are the loads that are considered in designing a roof truss?
10. Calculate the live load on truss if the angle of slope of roof is  $25^\circ$ .

**PART—B**

15×4=60

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

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

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. A flat of 150 mm × 8 mm is connected to a gusset plate by a lap joint. Design the joint by fillet welds along the sides of the flat only. Design strength of flat may be taken as 270 kN. Take  $f_u = 410 \text{ N/mm}^2$ ;  $r_{mw} = 1.25$ .
12. Calculate the design tensile strength due to yielding of gross section for ISA 90 × 60 × 6 mm with its longer leg is connected to the gusset plate by fillet welds. Take  $f_y = 250 \text{ N/mm}^2$ ;  $r_{mo} = 1.10$ .
13. Determine the design compressive strength of single ISLB450@653 N/m, when it is used as a column of effective length 4 m. Take  $f_y = 250 \text{ N/mm}^2$ .
14. Determine the size of square base plate required for a column of ISHB300@588 N/m carrying a factored load of 1500 kN. Take bearing strength of concrete as 9 N/mm<sup>2</sup>. Take  $f_y = 250 \text{ N/mm}^2$ ;  $r_{mo} = 1.10$ .
15. State the various design specifications for lacing of a built-up column as per IS : 800-2007.
16. Determine the design bending strength of a laterally restrained simply supported beam ISMB300@442 N/m. Take  $f_y = 250 \text{ N/mm}^2$ .
17. Write short notes on shear buckling design methods as per IS : 800-2007.
18. Draw a neat sketch of a roof truss and name the component parts.

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