



c09-c-602

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BOARD DIPLOMA EXAMINATION, (C-09)

APRIL/MAY—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. What are the physical properties of steel? State with values.
2. What are the different types of welds?
3. Calculate the design tensile strength of the connected leg only, of an angle section ISA 100 75 8 mm, if the failure takes place by rupture. The connection is made by welding.
4. The strength of tension member connected by welding is more than the member connected by bolting. Why?
5. Differentiate between lacing and battens.
6. What are the different types of cross-sections used as columns?

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7. What is lateral torsional buckling of beam?
8. What are the different types of stiffener plates provided for a plate girder? What are their functions?
9. List the component parts of roof truss.
10. How are wind loads determined on a sloped roof?

PART—B

10×5=50

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

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

11. An angle section ISA 100 75 8 mm is connected to gusset plate of thickness 10 mm by welding. It carries a factored tensile load of 300 kN. Design the joint assuming size of weld as 6 mm and the fabrication is to be done in the field. The welds are to be provided only at sides.
12. Design a tension member considering a single-angle section to carry a tensile force of 250 kN. Adopt length of connection as 150 mm.
13. Find 'non-dimensional effective slenderness ratio' for a built-up column made up of ISHB 300 @ 63 kg/m and two cover plates 300 mm 18 mm, one on each flange. The effective length of the column is 3.0 m and the yield stress in the steel is 250 MPa.
14. Compare the compressive strengths of ISLB 450 @ 65.3 kg/m and ISHB 300 @ 63 kg/m when they are used as columns of effective length 3.2 m. Take yield stress of steel as 250 MPa.
15. (a) What are the different types of a column base? Explain any one of them.
(b) Find the thickness of a base plate of size 420 mm 500 mm which is provided below a steel column carrying a total load of 800 kN. The projection of the base plate beyond the column in both the directions is 150 mm.

16. Determine the design bending strength of ISMB 350 @ 52.4 kg/m, if the beam is laterally restrained.
17. Determine the shape factor of a symmetrical I section with flange dimensions 250 mm 15 mm and web 275 mm 12 mm.
18. A Pratt truss of span 12 m and pitch 25° carries AC sheet roofing. The trusses are 3 m apart. The design wind pressure may be assumed as 1200 N/m². Determine (a) live load and (b) wind load at various nodal points of the truss.


