

**4716**

**BOARD DIPLOMA EXAMINATION, (C-14)  
MARCH /APRIL-2019  
DCE - SIXTH SEMESTER EXAMINATION**

**DESIGN OF STEEL STRUCTURES**

Time: 3 Hours

Max.Marks:80

**PART-A**

**10x3=30M**

**Instructions :** 1) Answer all questions. Each question carries Three marks.  
2) Use of IS 800-2007, IS 875 and steel tables are permitted.  
3) Assume data suitably, if necessary.

- 1) Name any six forms of rolled steel structures.
- 2) What are the different types of welded joints and sketch them
- 3) Calculate the design strength of a tension member due to yielding of gross section for ISA 100 X 75 X 8 mm
- 4) What are the factors that are affecting the strength of a tension member.
- 5) Write any three codal provisions to be followed in the design of lacing system as per IS: 800-2007.
- 6) State the equations of longitudinal shear and moments for which the battens are subjected at their ends.
- 7) Write down the component parts of a plate girder.
- 8) What is meant by laterally restrained beam?
- 9) Define slope and pitch of a roof truss
- 10) Determine the live load per square meter of plan area of the pitched roof of slope  $25^\circ$

## PART-B

**5x10=50M**

- Instructions:** 1) Answer any **five** questions. Each question carries ten marks.  
2) The answer should be comprehensive and the criteria for valuation is content but not the length of the answer.
- 11) An angle ISA 100X75X8 mm carrying an axial tension of 250 kN is to be connected to a gusset plate through its longer leg using side fillet welds only. Design the joint if the ultimate shear stress in the weld is 410 MPa. Assume connections are made at site.
  - 12) Determine the tensile strength of a single angle tension member ISA 90X60X8 mm connected to the gusset plate by 6mm size weld. The length of weld is 225mm. Take  $f_y=250 \text{ N/mm}^2$ ,  $f_u=410 \text{ N/mm}^2$
  - 13) Two channels ISMC 250 are to be placed back to back and used as column of an effective length of 5.0 m. Determine the minimum clear distance between backs of the channels. Also determine maximum design strength of column. Take  $f_y=330 \text{ MPa}$
  - 14) Design a single angle discontinuous strut for a roof truss carrying an axial load of 150kN. The length of the member from centre to centre of fastenings is 2.7m. Take  $f_y=250 \text{ MPa}$
  - 15) Design a Slab base for a column ISHB 300@ 577 N/m carrying an axial load of 1200 kN. M -20 grade concrete is used for foundation. Design the Pedestal also. SBC of soil is  $150 \text{ kN/m}^2$
  - 16) Design a rolled steel beam using I section for simply supported span 6m carrying a wall of 25 kN/m excluding the self weight. The beam is adequately supported laterally. Check the beam for deflection and shear if  $E=2 \times 10^5 \text{ N/mm}^2$  and  $f_y=250 \text{ N/mm}^2$ .
  - 17) a) Write a note on the effect of holes in the tension zone of a laterally supported beam.  
b) Write down the expression for the design bending strength of a laterally unsupported beam with usual notations and explain the various terms.
  - 18) The span and rise of a steel roof truss are 16 m and 4m respectively. The sloping length of one truss is divided into 4 equal parts on each side. The spacing of trusses is 3.0m. The basic wind pressure for that location is  $1500 \text{ N/m}^2$ . Assuming medium openings, Calculate the Dead load, Live load and wind loads on panel points. AC sheets are used as roof material. Assume medium permeability.