C09-C-602

3721

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH / APRIL - 2019

DCE - VI 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.*
(3) Answer should be brief and straight to the point.
(4) IS 800-2007, Steel tables, IS 875 are permitted to use.

1 List physical and mechanical properties of steel with values.

2 List out the advantages and disadvantages of welded joints over riveted joints.

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

4 Calculate the design strength of tension member due to yielding of gross cross section for ISA 125 × 95 × 8 mm.

5 Define (a) Slenderness ratio (b) Effective length.

6 List factor affecting the design strength of compression member.

7 Write down the component parts of a Plate Girder.

8 Define Shape Factor. Mention the shape factor values for a circular and I-section.

9 What are the loads to be considered in the design of steel roof trusses.

10 How much live load on truss is considered in design if the angle of slope of roof is 25° ?

PART - B **10×5=50**

Instructions : *(1) Answer any **FIVE** questions.*
*(2) Each question carries **TEN** marks.*
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11 An angle ISA 200 × 150 × 15 mm carrying an axial tension of 600 KN is to be connected to a gusset plate through its longer leg by side fillet welds only. Design the joint if the ultimate shear stress in the weld is 330 MPa. Assume connections are made in the workshop.

12 Determine the design strength of a tensile member ISA 125 × 75 × 8 mm when its shorter leg is connected to 10 mm thick gusset plate by 7 mm size fillet welds. The length of weld is 180 mm.
Take f_Y =250 Mpa, f_u = 410Mpa.

13 Determine the design compressive load for a stanchion ISHB 350 @ 710 N/m 3.5 m high. The column is restrained against translation and rotation at both the ends, use steel of grade Fe 410.

14 The strut of a roof truss with c/c of intersection is 1.6 m and subjected to an axial compression of 160 KN. Design the members using 2 unequal angles connected back to back through their longer legs on opposite sides of gusset plate by fillet welds . Take f_y = 250Mpa.

15 Design a square slab base for a column ISHB 300 @ 577 N/m carrying an axial load of 1000 KN. M_{20} concrete is used for the foundation. Yield stress of steel is 250Mpa. Also design the concrete pedestal if the safe bearing capacity of soil is 190 KN/m^2.

16 A simply supported beam ISMB 400 @604 N/m has an effective span of 5 m. Find

(i) The design bending strength of beam

(ii) The design shear strength of beam

(iii) The intensity of UDL that the beam can carry under service conditions

(iv) The Maximum deflection

Assume that the beam is laterally supported and the grade of steel is E250.

17 Design a simply supported beam of an effective span 6 m carries an UDL of 20 KN/m including self weight . If the compression flange of the beam is laterally restrained . Check the beam for shear and deflection. The grade of steel is Fe 250.

18 A roof truss shed is to be built in Lukhnow for an industry. The size of shed is 24 m × 40 m. The height of building is 12 m at the eves. Determine the basic wind pressure.
