6620
BOARD DIPLOMA EXAMINATION
JUNE - 2019
DIPLOMA IN CIVIL ENGINEERING
STEEL STRUCTURES
FIFTH SEMESTER EXAMINATION

Time: 3 Hours **Total Marks: 80**

PART - A (3m x 10 = 30m)

Note 1:Answer all questions and each question carries 3 marks

2:Answers should be brief and straight to the point and shall not exceed 5 simple sentences

3. Use of IS: 800-2007 , Is: 875-1987 and steel tables are permitted.

1. List any three physical properties of structural steel?
2. Write the provisions for overlap of welded joint as per IS 800-2007
3. Sketch the cross section of fillet weld and butt weld?
4. Calculate the design strength of a tension member due to gross section yielding for a plate of 200 mm width and 10 mm thickness. Take $f_y = 250$ MPa
5. Write any three provisions for design of double angle struts as per IS 800 – 2007?
6. Distinguish between column and strut?
7. Define a) Elastic moment of resistance b) Plastic moment of resistance
8. Mention the methods of shear buckling design?
9. Write the relation between design wind speed and design wind pressure?
10. Distinguish between plane truss and space truss?

PART - B (10m x 5 = 50m)

Note 1:Answer any five questions and each carries 10 marks

2:The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

3. Assume any data missing suitably.

11. Design a fillet weld to connect a plate of 80 mm x 8 mm to a gusset plate of 12 mm thickness. The tensile stress in the plate is 150 N/mm^2 and the ultimate shear stress in the weld is 330 MPa. Assume the connections are made at site

12. Design a single angle tension member of a roof truss to carry a tensile force of 150 kN. The angle is to be connected to a gusset plate through its longer leg by fillet welds. Take f_y = 250 MPa, f_u = 410 MPa. Assume L_c=200 mm. The length of the member is 3 m. The member is subjected to the possible reversal of stress due to action of wind

13. A continuous double angle strut consisting of two angles ISA 90 mm x 60 mm x 10 mm are placed back to back and connected to both sides of the gusset plate by fillet weld. The centre to centre distance of end connection is 2 m. The yield stress of steel is 300 MPa. Determine the design compressive strength of strut if the angles are connected together by tack welds along their length of the gusset plate of 12 mm thick?

14. Determine the design compressive strength of single ISHB 400 @ 822 N/m, when it is used as a column of 5 m height with both of its ends restrained against translation and rotation. The yield stress of steel used is 340MPa

15. Design a slab base for a column consisting of ISHB 300 @ 577 N/m. The column carries an axial load of 1000 kN.M20 grade concrete is used for foundation. Assume Fe 410 grade steel is used. Also design the welded connection between column and base plate

16. A roof of a hall measuring 8 m x 12 m consists of 100 mm thick RCC slab supported on steel I – beams spaced at 3 m C/c. The finishing load is taken as 1 kN/m^2 and live load as 1.5 kN/m^2. Design the steel beam. Take thickness of wall as 300 mm and f_y = 250 N/mm^2

17. An ISLB 300@377 N/m is subjected to factored bending moment of 130 kNm. Check the adequacy of the beam in bending. Assume Fe 250 grade steel and also that the beam is laterally supported

18. The span and rise of a steel roof truss are 16 m and 4 m respectively. The sloping length of one truss is divided into 4 equal parts on each side. The spacing of trusses is 3.5 m. AC sheets are used as roof material. The basic wind pressure for that location is 1500 N/m^2. Assuming large openings on one side of the building and wind blowing normal to ridge from the closed side. Calculate the dead load, live load and wind loads on panel points of windward and leeward sides with the following data.

    Unit weight of AC sheet roofing – 200 N/m^2 of plan area
    Unit weight of purlin - 100 N/m^2 of plan area
    Unit weight of bracing - 20 N/m^2 of plan area

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