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BOARD DIPLOMA EXAMINATION
MARCH/APRIL - 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 the different types of loads considered in design of steel structures?
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. State the different modes of failures of tension members?
5. Mention the factors affecting stress reduction?
6. Mention any three objectives of lacing?
7. Determine the shape factor for rectangular section of width b and depth d?
8. Name any six types of web stiffeners used in plate girder?
9. Write the relation between design wind speed and design wind pressure?
10. **Draw the sketches of any three types of pitched roof 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. An angle tie ISA 110 mm x 110 mm x 10 mm is carrying an axial design tension force of 250 kN is to be connected to a gusset plate of 12 mm thick by a lap joint using both side and end welds at site. Design the joint. Take the design shear stress in the fillet weld is 150 N/mm^2
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. 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

14. Determine the design compressive strength of a single angle discontinuous strut ISA 100 mm x 65 mm x 10 mm of length 2 m when connected to gusset plate through longer leg by fillet welds. Yield stress of steel is 340 MPa. Modulus of elasticity of steel is 2×10^5 MPa. The gusset plates are effectively restrained against rotation (both ends fixed).

15. An ISMB350 @ 524 N/m is used as a column. The column is laterally supported in the plane of the major axis at the height of 3.5 m and in the plane of minor axis at the height of 2.5 m. Both the ends may be assumed as hinged. What is the design load carrying capacity of the column. The grade of steel is E250

16. Design a simply supported beam of span 5 m carrying RCC floor capable of providing lateral restrained to the top compression flange. The UDL is madeup of 20 kN/m imposed load and 20 kN/m dead load. Assume Fe 410 grade steel

17. Determine the shape factor of a symmetrical I section with flange dimensions 250 mm x 15 mm and web 15 mm x 270 mm?

18. Determine the wind load on the nodal points of pitched roof truss of an industrial building located near Nellore with life span of 50 years for the following data

    Terrain category in which building is located – category 2
    Maximum dimension of building is 40 m
    Width of building is 15 m
    Height of eaves is 8 m
    Roofing angle is 30^0
    Spacing of trusses is 4 m and sloping length of each panel is 2 m
    Assume topography is with slopes less than 30^0 and building has medium permeability.

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