



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:VI
Class:TY	Program:B.Tech
Branch Code:CIV	Pattern:2022
Name of Course:Design of Steel Structures	Course Code:CIV223014(B)
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains two page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome of the Question/sub-question.
6. Use of IS 800:2007 and steel table is allowed

Marks CO

Question No. 1

- 1 a) A tension member of roof truss carrying factored load of 80 kN, consists of ISA 100 x 65 x 10 mm @ 12.2 kg/m connect to 10 mm thick gusset plate by fillet weld. Design welded connection assuming 5 mm weld size and draw the design sketch. (6) CO5

Question No. 2

- 2 a) Design a laced column with two channel sections placed back to back, with an effective length of 10 m carrying a factored load of 1000 kN. Calculate spacing between channels. (6) CO4

Question No. 3

- 3 a) Design an I-section column to carry a factored axial compressive load of 250 kN at an eccentricity of 150 mm about the major axis. Apply the section strength check only. The effective length of the column is 3m. (16) CO4

OR

- 3 b) i) A column section ISLB 350 @ 49.5 kg/m with an effective length of 3.5 m subjected to a factored axial load 450 kN and factored bending moment 60 kN.m. Check the adequacy of the section for section strength only. (16) CO4

ii) Design a slab base for the column consisting of ISMB 400 @ 61.6 kg/m that carries an axial factored load of 1200 kN. Use M20 grade of concrete. Design a welded connection between the column base and column. Provide 16mm bolts to connect the base plate with the concrete pedestal.

Question No. 4

- 4 a) Design a simply supported beam of a building having an effective span of 5 m, which carries a uniformly distributed working load of 35 kN/m, including self-weight. Design the beam so that the compression flange is laterally restrained throughout the span. Apply the usual checks. (16) CO6

OR

- 4 b) Design a simply supported steel joist 4 m effective span, carrying a uniformly distributed load of 15 kN/m if the compression flange of the joist is laterally unrestrained. Apply usual checks. (16) CO6

Question No. 5

5 a)

(16) CO3

Determine panel point dead load, imposed load and wind load for a truss located at Nashik as shown in Figure 5(a). Assume design wind pressure as 600 N/m^2 , use G. I. Sheet of self weight 130 N/m^2 and the centre to centre spacing of truss as 4.5 m . Assume self-weight of purlin 110 N/m and self weight of bracing 15 N/m^2 , $(C_{pe} - C_{pi}) = -1.5$. Height of truss is 3.2 m . Span of truss is 24 m . Draw the loading diagrams.

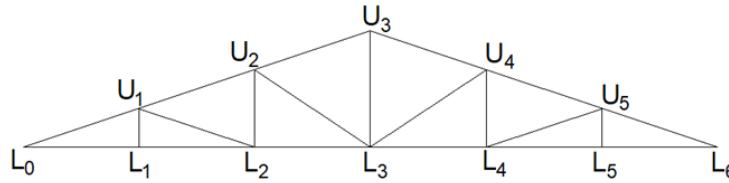


Figure 5(a)

OR

5 b) A simply supported welded plate girder of span 20 m is subjected to uniformly distributed load 40 kN/m on whole span including self weight of plate girder. Design cross section of plate girder, stiffeners. Connections are not required. Assume compression flange laterally supported throughout the span and yield stress of steel is 250 MPa . Draw design details. (16) CO6

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