

SECTION - C

6. Design a self supporting steel stack having a height of 80 m and 4 m in diameter. It is to be constructed in Delhi. The bearing capacity of soil is 140 kN/m^2 . The necessary relevant data may be assumed. 20
7. What are the classifications of tower? What are the design loads to be considered? Explain. 20

SECTION - D

8. A channel of $100 \text{ mm} \times 80 \text{ mm} \times 4 \text{ mm}$ section with a 25 mm lip is to be used as a concentrically loaded column of 3.1 m effective length. Determine the allowable load. Take $f_y = 235 \text{ N/mm}^2$. 20
9. Explain the local buckling in cold formed sections. Also explain the concept of effective width and effective sections. 20

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Roll No. _____

24511

**B. Tech. 7th Sem. (Civil)
Examination – February, 2022
DESIGN OF STEEL STRUCTURE-II**

Paper : CE-401-F

Time : Three hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is compulsory. Each question carries equal mark (20 marks). Students have to attempt five questions in total one question from each Section. Use of IS 800-1984 or 2007, IS 875-1987 and IS 801-1975 is allowed. Use of Steel Table is allowed. Assume suitable data.

1. Explain the following : 4 × 5 = 20
- (i) The roof slope of a truss in an industrial building is 22°30'. Estimate the live load as per IS 875.
- (ii) Explain stiffened and unstiffened compression element with neat sketch.

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(iii) Calculate the shape factor for the following:

(a) Rectangular section

(b) Hollow Tube section

(iv) Why is the plastic method of design more useful for redundant structures than the determinate structure?

(v) Explain Web crippling of beam with neat sketch.

SECTION - A

2. (a) A simply supported beam of uniform cross-section and span $2l$ is propped at the centre. Find out the collapse load if:

(i) A concentrated load is applied at the centre of the left hand span.

(ii) Equal concentrated loads are applied at the centre of each span. 10

(b) A fixed ended beam of uniform cross-section, fully plastic moment M_p of length $2l$ rests on simple supports at its ends and a central prop. Equal concentrated loads are applied at a distance a from each end of the beam, what would be the value of the collapse load? 10

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3. A portal frame is shown in figure. Find the value of W at collapse. 20



SECTION - B

4. Design the angle purlin for the following specifications: 20

Span of truss = $\tan c/c$

Pitch = $1/4$ of span

Spacing of purlin = $1.4 c/c$

Load from roofing material = 200 N/m^2

Wind load = 1200 N/m^2

5. Design a rectangular tank of capacity 100000 liters of water supported over a 10 m high staging. Columns are supported over concrete pedestal of M-20 Concrete. The bearing capacity of soil is 120 kN/m^2 . Design wind pressure may be assumed to be 2.05 kN/m^2 . Plates of 125 width and 8.75 m length are available. 20

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