Roll No. ....

24511

B. Tech. 7th Semester (Civil Engineering) Examination – May, 2019

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 : Attempt any *five* questions in all, selecting *one* question from each Section. Question No. 1 *compulsory*. All questions carry equal marks.

- Assume suitable data where required or missing.
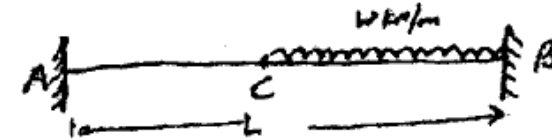- Use of code IS 800-1984, IS 801-1975 and Steel Table is allowed.

1. Explain the following : 5 × 4 = 20

   (a) Basic theorems of plastic analysis.

   (b) Failure mode of axial loaded column.

   (c) Types of stacks.

   (d) Plastic hinge.

   (e) Local buckling.

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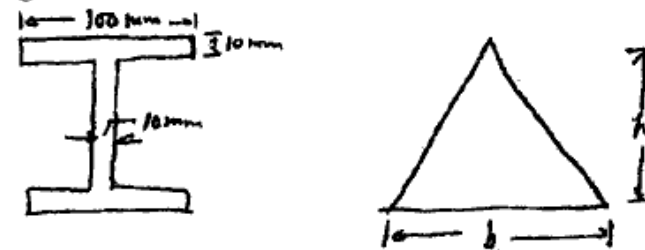## SECTION – A

2. Determine the collapse load of beam shown in Fig : 20

The beam is of uniform plastic moment Mp.

3. Calculate the shape factor of the section as shown in Fig : 10 × 2 = 20

SECTION – B

4. (a) What are the various loads that act on a roof truss ? Explain in detail. 10

   (b) What are the stepped columns ? With the help of a neat sketch show the various components of stepped columns. 10

5. Design the following components of a circular elevated water tank for a capacity of 165000 liters. The height of the tank bottom above the ground level is 8 m. The tank is supported over eight columns and is situated at the railway station in Allahabad : 20

24511-   -(P-4)(Q-9)(19) (2)

(a) Size of tank,

(b) Thickness of plates,

(c) Connections.

SECTION – C

6. Design a self-supporting steel stack with a 100 m height to be constructed at Allahabad. The diameter of cylindrical shaft is 4 m. The stack has 110 mm thick lining Design the plates of stack, base plate and anchor bolts only. Assume the necessary relevant data. **20**

7. (a) Explain the design condition of transmission line towers. **10**

   (b) What are the various loads acting on transmission line towers ? **10**

SECTION – D

8. Design the column section and allowable load for the column section as shown in Fig. The effective length of column is 4 m. Take $f_y = 250 \, \text{N/mm}^2$. **20**
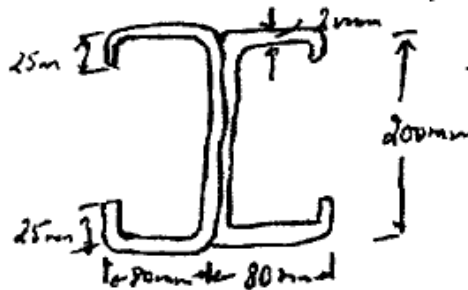
9. Explain the following : $10 \times 2 = 20$

   (a) Multistiffened Elements and Flat width ratio.

   (b) Adequacy of edge stiffner for compression element.