

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), April-May 2015

B. Tech. in Civil Engineering, Semester VI



Roll No.....

CE 602 : STEEL STRUCTURES- II

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units and drawing neat sketches wherever, required are an integral part of the answer.
4. Use of IS codes and Steel Table is to be permitted.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. Yield stress of normally rolled structural steel is about.....MPa.
(500,415,250)
- ii. Bending moment developed at the plastic hinges as met in plastic analysis of structure is plastic moment Of the section. (capacity, requirement, condition)
- iii. A..... is defined as a structural member subjected to compression in a direction parallel to its longitudinal axis. (strut, purlin, truss)
- iv. When wind load is considered in designing of steel structure, the permissible stress is exceeding by..... (33%, 30%, 25%)
- v. If the percentage of carbon is increased in steel, then it will decrease ductility. (True, False)
- vi. Mainly used rolled steel sections as structural members are I-section, channel section, T-section, angle section. (True/False)
- vii. The permissible bending stress for tension members is $0.6 f_y$. (True/False)
- viii. Define steel stack.
- ix. What is permissible stress?
- x. In steel stack, stress due to wind moment at the upper collar 6_m is calculated as

Q.1B Short answer type questions (4 questions @ 2.5 marks)

10

- i. Write any five Assumptions of Plastic Analysis.
- ii. Draw stress strain curve for plastic method and explain each points.
- iii. In what way Plastic design methods are different from elastic method methods?
- iv. Distinguish between the elastic modulus and plastic modulus of a section.



Q.2 Explain Hot Rolled Section and Cold Formed Section. 05

Q.3 Find the collapse load in a fixed beam of span "L" carrying uniformly distributed load over the entire span. Plastic moment capacity is " M_p " throughout. 05

OR

Q.3 Explain advantage of plastic design. 05

Q.4 Explain design requirement of transmission tower as per IS code. 05

Q.5 Write the equation for M_p for an I-section subjected to moments and shear force as per IS-800 code. 05

Q.6 Draw neat sketch of self-supporting steel stack and Guyed steel stack. 10

Q.7 Why plastic theory is applied to steel not to concrete? Determine the plastic moment carrying capacity of T-section having 600mm x 200mm flange and 400mm x 30mm web. Take $f_{yp}=250$ mpa. 10

Q.8 Design dimension of a circular elevated water tank for a capacity of 2, 50,000 liters. The height of the tank bottom above the ground level is 8.7m. The tank is supported over eight columns and is situated at the railway station in Allahabad. 10

Q.9 Design upper portion of the guyed steel stack for the following data: 15

1. Diameter = 1.5m
2. Height = 30m
3. Shape factor = 0.7
4. Average wind pressure, $P_d = 1.2$ KN/m²
5. Assume initial tension in guy wire = 35 N/m²
6. Total corrosion allowance = 4.5 mm

Also check for compressive Stress.

OR

Q.9 Find the shape factor for the following sections: 15

1. Square of side "a" with its diagonal parallel to z-z axis shown in Figure (a)
2. Prove that shape factor for circular section of radius "r" is 1.7 shown in Figure (b).
3. A diamond section with unequal diagonals, the shorter being "b" and longer "d"; the shorter diagonal placed parallel to the x-x axis shown in Figure (c).

Q.10 Design suitable section for a two span continuous beam, each having a span of 15 m and supporting a D.L of 20 kN/m and live load 30 kN/m by, (A) Plastic design procedure. 15