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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

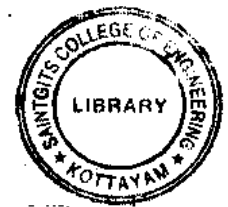
Sixth Semester

Branch : Civil Engineering

CE 010 601—DESIGN OF STEEL STRUCTURES (CE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]



Time : Three Hours

Maximum : 100 Marks

*Missing data, if any may, be suitably assumed and stated.
IS 800-2007, IS 875, IS 805, IS 801, IS 811, IS 6533 Part 1, Part 2, and steel tables are allowed.*

Part A

*Answer all questions.
Each question carries 3 marks.*

1. Write three advantages of bolted connections.
2. Draw the moment-rotation curves for different types of connections.
3. Draw a qualitative diagram showing the variation of bending moment, shear force and twisting moment along the length of a ring beam of a circular water tank, between the columns.
4. Mention where light gauge structures are commonly used.
5. Explain how stability is checked in the case of a chimney in the design process.

(5 × 3 = 15 marks)

Part B

*Answer all questions.
Each question carries 5 marks.*

6. Explain the modes of failure of a tension member.
7. Determine the design compressive strength of an ISHB 300 section, 4 m long pinned at both ends.
8. Explain the design procedure of the supporting structure of a rectangular steel water tank.
9. Explain the behaviour of stiffened and unstiffened compression elements made up of light gauge sections.
10. Explain how the base plate of a chimney is designed.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each question carries 12 marks.

11. Find out the value of plastic modulus for the following sections :

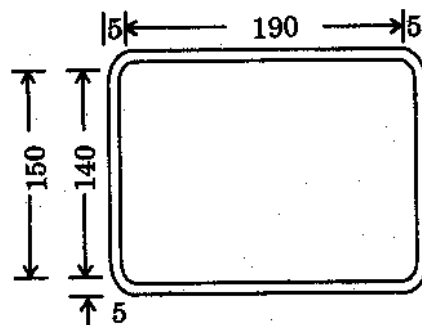
- (i) An isosceles triangles of height ' h ' and base ' b ' bent about an axis parallel to the base.
- (ii) An I-section of overall depth 300 mm. and flanges 200×20 mm, web 10 mm. thick, bent about its strong axis.

Or

12. A beam of span 9 m. carries a uniformly by distributed load of 12 kN/m. The depth of the beam is limited to 450 mm. from clear head room requirements. Design the cross-section of the beam. Use Fe 415 grade steel.
13. Design a built up column with four angles laced together. The effective length of the column is 7.20 m. and it supports a factored load of 1800 kN. Design the lacings also.

Or

14. Design the section of the steel column and suitable base for an axial compressive load of 2400 kN. The effective length of the column is 5.5 m. The concrete used for making the pedestal is of M₃₀ grade.
 15. Design the overhead portion of a circular water tank with hemispherical bottom of capacity 150 m³. The tank has conical roof. Take $f_y = 250 \text{ N/mm}^2$.
- Or
16. Design the tank portion of a rectangular water tank of capacity 120 m³.
 17. Find the allowable axial load for a column section shown in Fig. 1. The effect length of the column is 3.50 m. Take $f_y = 235 \text{ N/mm}^2$.



Or



18. Determine the allowable load per meter on a beam with cross section as shown in Fig. 2. The beam has an effective span of 2 m. $f_y = 235 \text{ N/mm}^2$.

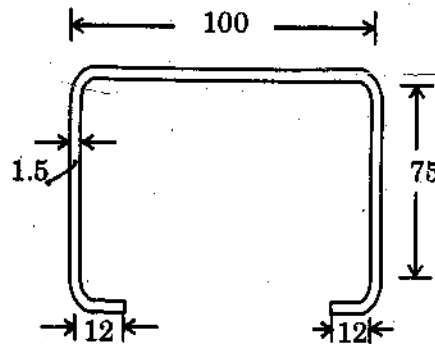


Fig. 2.

19. Design only the chimney of a self supporting stack of effective height 35 m. having its diameter at top equal to 2.10 m. Take wind pressure intensity as 1.5 kN/m^2 .

Or

20. Design the chimney of a self supporting stack of effective height 72 m. above foundation. The diameter of the cylindrical part is 4.50 m. Foundation is raft on medium soil. The chimney is in Chennai.

(5 × 12 = 60 marks)

