

G 1399

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

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

Part A

Answer all questions.

Each question carries 3 marks.

1. Write a note on available structural steel sections.
2. List the classification of columns.
3. Which are the different types of water tanks available.
4. Mention some applications of light gauge steel structures.
5. List the permissible stresses in chimneys.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. List the steps involved in the design of a tension member.
7. Differentiate between slab base and gusseted base.
8. What are the loads to be considered in the design of elevated tanks ?
9. Explain the phenomenon of local buckling in light gauge steel structures.
10. What do you mean by a self supporting chimney ?

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each full question carries 12 marks.

11. Calculate the strength of a 20 mm diameter bolt of grade 4.6 for the following cases. The main plates to be jointed are 12 mm thick :
 - (a) Lap joint.
 - (b) Single cover butt joint ; the cover plate being 10 mm thick.
 - (c) Double cover butt joint ; each of the cover plate being 8 mm thick.

Or

Turn over

12. Design a laterally unsupported beam for the following data :—

Effective span	:	4 m
Maximum bending moment	:	550 kNm
Maximum shear force	:	200 kN
Steel of grade	:	Fe 410

13. Design a built-up column 9 m long to carry a factored axial compressive load of 110 kN. The column is restrained in position but not in direction at both the ends. Design the column with connecting system as battens with bolted connections. Use two channel sections back-to-back. Use steel of grade Fe410.

Or

14. A column ISHB 350 at 661.2 N/m carries an axial compressive factored load of 1700 kN. Design a suitable bolted gusset base. The base rests on M15 grade concrete pedestal. Use 24 mm diameter bolts of grade 4.6 for making the connections.

15. Design the overhead portion of a rectangular tank of 80,000 litres capacity.

Or

16. Design the elevated position of a cylindrical steel tank with hemispherical bottom for 1,60,000 litres capacity. The tank has conical roof. Take $f_y = 250 \text{ N/mm}^2$.

17. A square box section $200 \text{ mm} \times 200 \text{ mm} \times 2 \text{ mm}$ is to be used as a column of effective length 4 m. Find the maximum load it can carry.

Or

18. Design a beam to span 5 m carrying a load inclusive of self-load of 1000 N/m. The ends of the beam are unrestrained against lateral bending.

19. Design a self-supporting chimney of 100 m height. The diameter of cylindrical shell is 4 m. The chimney has a 100 mm thick brick lining supported on the shell.

Or

20. Which are the different types of steel chimneys ? Explain in detail the forces acting on steel chimneys.

(5 × 12 = 60 marks)

