G 6520

M.E. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

Structural Engineering

ST 1653 — STEEL STRUCTURES

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Assume required data suitably .

Use of IS 800, IS 875 and Steel Tables are permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the various components of an industrial building?

2. Mention the various load combinations for a roof truss.

3. Draw a welded stiffened seated connection.

4. What do you mean by semi-rigid connection?

5. Explain the advantages and disadvantages of cold formed steel structures.

6. Differentiate between the stiffened and multi-stiffened elements in cold formed steel structures.

7. Write an equation to determine the fundamental period of oscillation of a water tank.

8. What are the principal reasons for the use of elevated water tank?

9. Define plastic moment.

10. What are the advantages of plastic design over elastic design?

PART B — (5 × 16 = 80 marks)

11. (a) Design an I section purlin for an industrial building situated in Allahabad, to support a galvanized corrugated iron sheet roof having weight 130N/m^2 for the following data:

Spacing of the truss = 6 m

Span of the truss = 12 m

Spacing of the purlin = 1.5 m

Intensity of the wind pressure = 2kN/m^2

Or

(b) A member of a riveted truss consists of two angles connected back to back with a gap of 12 mm. The axial force in the member is 22 kN (compression) due to dead load, 25 kN (compression) due to live load and 50 kN (tension) due to wind load. The distance between the centers of end connection is 2.5 m. Design the member and end connection.

12. (a) An ISLB 350 @ 0.495 kN/m transmits an end reaction of 290 kN to the web of an ISMB 500 @ 0.869 kN/m. Design a framed connection.

Or

(b) An ISMB 500 @ 0.869 kN/m transmits an end reaction of 130 kN and an end moment of 120 kN-m to the flange of a column ISHB 250 @ 0.510 kN/m. Design the welded connection.

13. (a) Design a square box cold formed steel section for a height 4m to carry an axial load of 50 kN.

Or

(b) Design a Z — shaped purlin for a span of 6 m to carry 1000 N/m.

14. (a) Design a pressed steel tank for a capacity 90 m^3 Also design its stays and supporting beams. Staging design not required.

Or

(b) Design a self supporting steel chimney of effective height 30m. The diameter at top is 2.5m. Take a uniform wind pressure as 1 .2 kN/m^2.

15. (a) Find out the collapse load for a portal frame of uniform cross section shown in Fig.1.

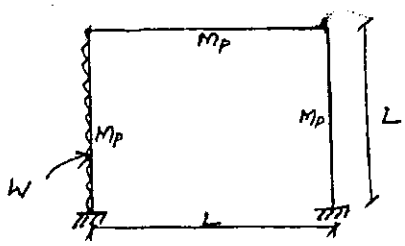

Fig. 1

Or

(b) Design a beam of span 10 m to support a live load of 20 kN/m using limit state method.
