

[4759]-16

B.E. (Civil)

ADVANCED STRUCTURAL DESIGN
(2008 Pattern) (Elective - III)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) Answer any two questions from Section I and two questions from Section II.
- 2) Answers to the two sections should be written in separate answer books.
- 3) Figures in bold to the right, indicate full marks.
- 4) If necessary, assume suitable data and indicate clearly.
- 5) IS 800, 801, 811, 456, 1893 and Steel Table are permitted in the examination.
- 6) Use of electronic pocket calculator is allowed.

SECTION -I

- Q1)** a) Explain the design procedure for a simply supported beam subjected to a uniformly distributed load using cold form light gauge steel. **[10]**
- b) A light gauge steel rectangular box section $180 \text{ mm} \times 90 \text{ mm} \times 2 \text{ mm}$ is used as a column. The effective length of the column is 2.6 m. Determine the safe load capacity of the section. **[15]**

- Q2)** A castellated beam with hexagonal openings is to be designed for a simply supported span of 12 m. The provisions of ducts restrict the spacing of openings at 350 mm c/c. The total load imposed on the beam is 6kN/m. Design the beam. **[25]**

- Q3)** Analyze the gable frame shown in Fig. 1 and design member BC. Take $W = 25 \text{ kN}$. **[25]**

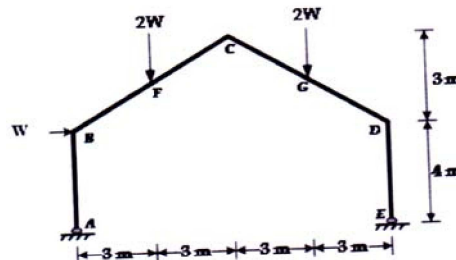


Fig.-1

P.T.O.

SECTION - II

- Q4)** a) Write a note on the methods available for the analysis of flat slabs. [5]
b) Design an interior panel of a flat slab of size $4\text{ m} \times 4\text{ m}$. The flat slab is to be provided with a drop. The slab is supported on circular columns of size 350 mm diameters. The imposed load on the slab is 5 kN/m^2 . Use M 25 grade of concrete and Fe 415 grade of steel. Sketch the details of reinforcement. [20]
- Q5)** Design a grid slab of size $9\text{ m} \times 6\text{ m}$. The imposed load on the slab is 4 kN/m^2 . Use M 25 grade of concrete and Fe 415 grade of steel. Sketch the details of reinforcement. [25]
- Q6)** a) Write a note on hydrodynamic forces in tanks. [5]
b) An elevated water tank is 10 m in diameter and 5 m high. The depth of water is 4.70 m. It is supported on a concrete staging of 8 columns located on the circumference of a circle of 8 m diameter. The height of the staging is 16 m and horizontal bracing is provided at a vertical spacing of 4 m. The circular columns are 500 mm in diameter. Steel bars of 25 mm diameter are provided as diagonal bracing in all the bays as shown in Fig.2. The structure is located in Zone III and founded on Type III type of soil. The weight of the empty tank may be taken as 2000 kN. Obtain the equivalent stiffness for the staging. Also, obtain the base shear for
i) tank full, and
ii) tank empty condition.

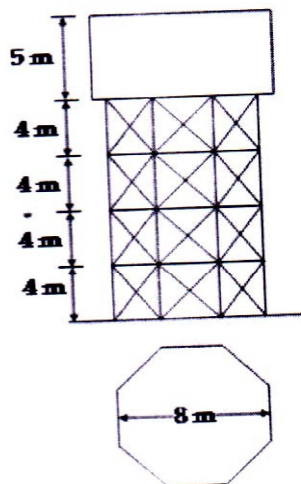


Fig. 2

