[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

Dec-25-0221

CE-601 (Design of Concrete Structures-II)

B.Tech. 6th (CBCS)

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C and D. Section E is compulsory. Relevant codes are allowed. Assume any missing data.

SECTION - A

1. Two columns A and B are spaced 5m centre to centre. Column A is 300 × 300 mm and B is 400 × 400 mm are loaded with 600 kN and 900 kN respectively. The maximum length of footing is restricted to 7m only. The safe bearing capacity of soil is 120 kN/m^2. Use M 20 concrete and Fe 415 steel. Design a trapezoidal combined footing. (10)

2. Design an Isolated unsymmetrical square footing for a column 500mmx500mm, transmitting a load of 600kN and a moment of 30kN-m. The safe bearing capacity of soil is 120kN/m^2. Use M 20 concrete and Fe 415 steel. (10)

SECTION - B

3. Design a Counterfort retaining wall to retain 7m embankment above ground level. The foundation is to be taken 1m deep where the safe bearing capacity of soil may be taken as 180 kN/m^2. Top of earth retained is horizontal, and soil weight 18kN/m^3 with angle of internal friction is 30°. Coefficient of friction between concrete and soil may be taken as 0.5. Use M 20 concrete and Fe 415 steel. (10)

4. (a) Design a counterfort retaining wall for a given height and backfill condition. Present detailed calculations for key parameters such as base width and reinforcement. (5)

   (b) Differentiate between the active pressure and passive pressure of the earth in retaining wall structures. (5)

SECTION - C

5. Explain the design considerations for an elevated water tank with an Intze type container. Discuss the structural components involved and their functions in the design. (10)

6. Design a circular water tank with flexible base of capacity of 400000 liters. The depth of water is to be 4m, including a free board of 200mm. Use M 20 concrete and Fe 415 steel. (10)

SECTION - D

7. Discuss the general principles of earthquake-resistant design, focusing on the concept of ductility. Why is ductility a critical factor and what are the advantages it offers in seismic design? (10)

8. Explain the concept of design lateral forces in earthquake-resistant design. What are the primary considerations when determining these forces, and how are they distributed vertically within a building? (10)

SECTION - E (Compulsory)

9. Answer the following:

   (a) Define punching shear in the context of footings.

   (b) Write the design lateral forces on beams and columns.

   (c) What are the stability considerations for cantilever retaining walls?

[P.T.O.]

(d) Discuss the design process for circular underground water tanks using IS code methods.

(e) What factors affect bending moments in footings?

(f) Briefly explain the concept of earthquake resistance in water tank design.

(g) What are the causes of failure of foundation?

(h) Define various types of footing.

(i) Differentiate between the rectangular and trapezoidal footing.

(j) Define classification of water tank. (10×2=20)