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Question Paper Code : 31017

28th AN

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Seventh Semester

Civil Engineering

080100048 — DESIGN OF REINFORCED CONCRETE STRUCTURES

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Use of IS 456-2000 and other relevant codes permitted

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. When do you prefer counter fort type retaining wall?

2. Draw a sketch showing the reinforcement details of the connection of heel, toe and stem in cantilever retaining wall.

3. State the necessity of providing bracing in a staging of water tank.

4. What are the various types of water tanks?

5. What is the principle of prestressed concrete?

6. What are the disadvantages of flat slabs?

7. State any two assumptions in selection of collapse yield line pattern.

8. How do you determine collapse load?

9. What are the various types of IRC loadings on bridges?

10. What are the advantages of prestressd concrete bridges?

PART B — (5 × 16 = 80 marks)

11. (a) Design the vertical stem of a counter fort retaining wall if the height of the wall above the ground level is 5.60 m. The safe bearing capacity of the soil is 175 KN/m^2. The unit weight of soil is 18 KN/m^3. The angle of repose of the soil is 30^0. The co-efficient of friction between the soil and concrete is 0.50. Assume the spacing of the counter forts as 3m. Adopt M30 concrete and Fe 415 steel.

Or

(b) Design a cantilever retaining wall to retain an earth embankment with a horizontal top 3.60 m above ground level. The safe bearing capacity of the soil is 200 kN/m^2. The unit weight of soil is 18 kN/m^3. The angle of repose of the soil is 30^0. Adopt M25 concrete and Fe 415 steel. Assume that the co-efficient of friction between the soil and concrete is 0.50.

12. (a) Design the side walls of an underground water tank of size 3m × 8m × 3m for the following data :

Type of soil – Submerged sandy soil with unit weight 16KN/m^3 and angle of repose 30^0.

Water table is at ground level.

Or

(b) Design the cylindrical walls and bottom slab of a flat bottom circular elevated water tank of diameter 10m and height 4m. The diameter of the ring beam supporting the water tank is 7.50 m. The ring beam is supported by six columns. Use M25 concrete and Fe 415 steel.

13. (a) Design a dog-logged stair for a building in which the vertical distance between the floors is 3.5m. The stair hall measures 2.60 m × 5.20 m. Use M_{20} concrete and Fe 415 steel.

Or

(b) A flat slab foor of size 5m × 5m supports a live load of 4KN/m^2 and floor finish of 1kN/m^2. Determine the design moments for an end panel. Assume that the slab thickness as 250mm and columns to be circular with diameter 460 mm each.

14. (a) An isotropically reinforced square slab of side 'a' is simply supported over its edges. The ultimate moment capacity per unit width is 'mu' in both span directions. Determine the ultimate uniformly distributed load the slab can, carry under given conditions.

Or

(b) A square slab of side 4m is simply supported at the ends and carries service live load of 3 kN/m^2. Design the slab using yield line theory.

15. (a) Explain briefly the various types of bridges.

Or

(b) Design a simple slab bridge. The clear span is 5.50m. The clear width of carriageway is 6.80m. Assume class 'A' loading and M30 concrete.
