Question Paper Code : 41017

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Seventh Semester

Civil Engineering

080100048 – DESIGN OF REINFORCED CONCRETE STRUCTURES

(Regulation 2008)

(Use of IS 456, IS 3370 (Part I, II and IV), IS 1343, IRC 5, IRC 6 and IRC 21 Permitted)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   When do you prefer counter fort retaining wall?

2.   State the necessity of providing shear key in retaining wall.

3.   State the reasons for not using rectangular underground tanks for large capacity.

4.   Define a Dome.

5.   What are the disadvantages of flat slabs?

6.   What are the various types of pre stressing?

7.   Define yield line.

8.   State the principle of virtual work.

9.   What are the various forces on the walls of the Box Culvert?

10.   What do you mean by effective width?

PART B — (5 × 16 = 80 marks)

11. (a) Design the stem of a cantilever retaining wall to retain an earth embankment 4 m high above ground level. The density of earth is 18 kN/m³ and the angle of repose is 30°. The embankment is horizontal at top. Adopt M-20 grade concrete and Fe-415 HYSD bars.

Or

(b) Determine the dimensions of the base slab of a counter fort retaining wall and check the stability conditions if it retains soil to a height of 6 m from the foundation level. The density of soil is 16 kN/m³ and the angle of internal friction is 33°. The co-efficient of friction between the foundation soil and concrete is 0.40. The spacing of counter forts is 3 m centre to centre. The safe bearing capacity of soil is 160 kN/m². Use M 20 grade concrete and Fe-415 HYSD bars.

12. (a) Design a circular tank with domical top for a capacity of 4,00,000 litres. The depth of water is 4 m with a free board of 20 cm. The tank is supported on masonry tower and bottom of the tank consists of a dome having a central rise of 2.20 m.

Or

(b) A rectangular water tank 4.50 m long, 2.25 m wide and 2.25 m high has its wall rigidly jointed at the vertical edges and pin jointed at their horizontal edges. Design the tank if it is supported on all sides under the wall.

13. (a) Determine the dimensions of a flat - slab system with drops for a four-storey building with 5 spans of 7.5 m in the longer direction, 5 spans of 6 m in the shorter directions and a storey height of 3 m.

Or

(b) Design a dog-legged stair for a building in which the vertical distance between the floors is 3.60 m. The stair hall measures 2.5 m × 5.00 m. The live load may be assumed as 3000 N/m². Use M 20 concrete and HYSD bars.

14. (a) A square slab of side 4 m is simply supported at the ends and carries a service. Live load of 3 kN/m². Design the slab. Use M 20 concrete and Fe 415 steel bars.

Or

(b) Design a reinforced circular Slab for a following data :

- Diameter of slab - 5.5 m

- Service live load - 4 kN/m²

- Floor finishing load - 1 kN/m²

- Grade of concrete - M 20

- Grade of steel - Fe 415

The slab is simply supported along the edges.

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15. (a) The clear span of solid slab bridge for class a loading is 4.5 m. The clear width of roadways is 7.00 m. The thickness of wearing loading is 80 mm. Use M20 mix. Determine the maximum live load bending moment using effective width method.

Or

(b) What are the various IRC loadings? Explain.

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