Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐

R 3177

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Seventh Semester

(Regulation 2004)

Civil Engineering

CE 1401 — DESIGN OF REINFORCED BRICK MASONRY STRUCTURES

(Common to B.E. (Part-Time) Sixth Semester Regulation 2005)

Time : Three hours   Maximum : 100 marks

Special Instructions : IS 456, IS 3370 (Part III and IV), IS 1905, IS 875 and All IRC Codes are permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What do you mean by the back fill of a retaining wall?

2. List out the various forces subjected to a cantilever retaining wall.

3. What are the effect of joint reactions due to continuity in a water tank design?

4. Why the uplift pressure is critical on the floor of the underground tanks?

5. What are the various causes for arising the longitudinal force in a Road Bridge?

6. Draw a neat sketch of flat slab with drop pannel and column head?

7. List out any two characteristic of yield lines.

8. Write the equation for calculating the ultimate moment in a orthotropically reinforced rectangular slab.

9. What is the purpose of providing a laterall support in a Masonry structure?

10. What do you mean by shape modification factor?

PART B — (5 × 16 = 80 marks)

11. (a) Design a 'T' shaped cantilever retaining wall for the following data :

    (i)   Height of wall above ground – 3.5 meter.

    (ii) Depth of foundation – 1.30 meter

    (iii) Unit weight of Earth fill – 18 KN/m³

    (iv) Angle of internal friction, - 25°

    (v)   Co-efficient of friction between soil and concrete – 0.44

    (vi) Safe bearing capacity of soil – 140 KN/m²

    (vii) Adopt M 20 grade concrete and Fe 415 grade steel.

Or

    (b) Explain the methods of designing a shear Key in a Retaining wall.

12. (a) Design the side wall of a circular tank of capacity 1.5 lakh litres of water. The depth of the tank is limited to 2.5 m. The joint between the wall and base as flexible. The base slab rest on the ground. Use M 20 grade concrete.

Or

    (b) Design an underground water tank 4m × 9 m × 2.5 m deep. The sub soil consist of silt having angle of repose of 30°, and saturated unit weight of 18 KN/m³. The water is likely to rise up to ground level. Use M20 grade concrete and Fe 415 grade steel.

13. (a) Design a dog-legged stair for a building in which the vertical distance between the floor is 3.6 meter. The stair Hall measures 2.4 meter × 5 meter (inner dimensions) The live load on the stair is 3000 N/m². Adopt M20 Grade concrete and Fe 415 Grade steel.

Or

    (b) Design an interior pannel of a flat slab, 5.5 m × 5.5 m for a live load of 5000 N/m². Use M20 grade concrete and Fe 415 grade steel.

14. (a) Derive the expression for calculating the ultimate moment (virtual work method) for a simply supported square slab.

Or

(b) Design a circular slab of 4.5 metre diameter, simply supported along the edges, to carry a service load of 5 KN/m². Adopt M20 Grade concrete and Fe 415 Grade steel. Use Equilibrium method for analysis.

15. (a) Design a solid wall of a single storey Mill building that is 3000 mm in height, securely tied with roof and floor units and supporting two beams on either side of it. That exert reactions of 30 KN and 20 KN. The thickness of the wall is 230 mm. The beam bears on the wall is 115 mm. Assume uniform bearing stress. Neglect the load due self-weight.

Or

(b) Design a solid square masonry column of height 2000 mm, to carry an axial load of 150 KN. The column is tied at the top and bottom. Include the self weight of the column for the design.

R 3177