Reg. No. | | | | | | | | | | | | |

Question Paper Code : 57185

B.E./B. Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Civil Engineering

CE 6601 – DESIGN OF REINFORCED CONCRETE & BRICK MASONRY STRUCTURES

(Regulations 2013)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. List the forces that act on a retaining wall.
2. Give the expression to check overturning in Retaining wall.
3. Mention any two codal provisions specified for the design of water tanks.
4. What is meant by a sliding joint ?
5. When is a flat slab preferred ?
6. List the methods of analysis of flat slabs.
7. Define yield line theory.
8. List any two assumptions of yield line theory.
9. Define slenderness ratio of a masonry wall.
10. List any two factors which affect the permissible stress of a masonry.

PART – B (5 × 16 = 80 Marks)

11. (a) Design a cantilever retaining wall to retain horizontal earthen embankment of height 4 m above the ground level. The earthen backfill is having a density of 18 kN/m^3 and angle of internal friction as 30°. The safe bearing capacity of the soil is 180 kN/m^3. The coefficient of friction between soil and concrete is assumed to be 0.45. Use M20 concrete and Fe415 steel.

OR

(b) Design a counterfort retaining wall to retain 4 m earth above ground level. The top of the earth is to be level. The density of earth is 15 kN/m^3. The angle of internal friction of soil is 30. The safe bearing capacity of soil is 200 kN/m^2 and the coefficient of friction between soil and wall is 0.6.

12. (a) Design a rectangular underground tank of dimensions 10 m × 4 m × 4 m with following data :

Density of soil = 16 kN/m^3

Angle of repose = 30

Live load on top slab = 3 kN/m^2

Use M25 concrete and Fe 415 steel.

OR

(b) Design an elevated circular water tank of 500 kl capacity with a top dome. The tank is supported on a masonry tower. The depth of water tank is 5 m. Take unit weight of water = 10 kN/m^3. Take live load on dome as 1.0 kN/m^2.

13. (a) Design an interior pane of a flat slab with the following data :

Size of floor = 20 m × 20 m

Size of panels = 5 m × 5 m

Live load = 4 kN/m^2

Size of the column = 500 mm diameter

OR

(b) Design a dog legged staircase for an office building in a room measuring 3 m × 6 m (clear dimension) floor to floor height is 3.5 m. The building is a public building liable to overcrowding. Stairs are supported on brickwalls 230 mm thick at the end of landings. Use M_{20} concrete and Fe 415 steel.

14. (a) Determine the collapse load for a square slab fixed all around the edges with following data :

Size = 5 m × 5 m

Reinforcement = 8 mm diameter @ 150 mm c/c in both directions

Total depth = 130 mm

Effective cover = 30 mm

Use M_{20} concrete and Fe 415 steel.

OR

(b) Determine the permissible superimposed load carried by a simply supported isotropically reinforced circular slab of radius 3 m. The slab is 120 mm thick and is reinforced with 10 bars at 120 mm c/c in the two mutually perpendicular directions. Take effective cover as 25 mm and M20 concrete and Fe 415 steel.

15. (a) Determine the allowable axial load on column 300 mm × 60 mm constructed in first class brickwork in CM 1:6 using modular bricks 200 mm × 10 mm × 100 mm. The height of pier between the footing and top of slab is 5.2 m. The strength of units may be assumed as 10.5 MPa.

OR

(b) A masonry wall is subjected to an axial load of 150 kN and bending moment of 30 kNm. The height of the wall is 4 m. Design the wall.

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