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

Question Paper Code : 91311

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Sixth Semester
Civil Engineering
CE 6601 – DESIGN OF REINFORCED CONCRETE AND BRICK MASONRY STRUCTURES
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Use of IS 456-2000 and SP 16 is permitted.
Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. List the types of retaining wall.
2. What is the angle of internal friction.
3. Name the joints which are provided between the circular water tank wall and the floor.
4. Why the uplift pressure is critical on the floor of the underground tanks ?
5. List the types of stairs.
6. Write the advantages of flat slabs.
7. Define yield line theory
8. List any two assumptions of yield line theory.
9. Obtain the stress reduction factor for an eccentrically loaded masonry member with slenderness ratio of 12 and eccentricity to thickness ratio of 1/12.
10. Why is it intended to limit the slenderness of the load bearing masonry walls ?

PART – B **(5×13=65 Marks)**

11. a) Design a stem of 5 m tall reinforced concrete cantilever type retaining wall. The wall retains soil level with its top. The soil weighs 18000 N/m^3 and has an angle of repose of 30°. The safe bearing capacity of the soil is 200 kN/m^2. Use M20 concrete and Fe 415 steel.

(OR)

b) Analyze the stability of a counter fort retaining wall to the following particulars.
Overall height of the wall = 7 m
Weight of soil = 16000 N/m^3
Safe bearing capacity of the soil = 180 kN/m^2
Angle of repose of the soil = 35°
Surcharge angle = 15°, Use M20 concrete and Fe 415 steel.

12. a) A reinforced concrete dome of 6 m base diameter with a rise of 1.25 m is to be designed for a water tank. The uniformly distributed live load including finishes on dome may be taken as 2 kN/m^2. Adopting M20 concrete and Fe415 grade steel, design the dome and the ring beam.

(OR)

b) Design an RC tank of internal dimensions 10 m × 3 m × 3 m. The tank is to be provided underground. The soil surrounding the tank is likely to get wet. Angle of repose of soil in dry state is 30° and in wet state is 6°. Soil weighs 20 kN/m^3. Adopt M20 concrete and Fe415 Grade steel.

13. a) A flight of a dog-legged staircase has the following details :
Going = 2.25 m
Landing width = 1.25 m
Rise of a flight = 1.5 m
Support width = 300 mm
Choosing appropriate dimensions for rise and tread and taking the flight to span longitudinally between the supports, design the flight. Assume live load as 3 kN/m^2.

(OR)

b) Design the interior panel of a flat slab with drops for an office floor to suit the following data :
Size of office floor = 20 m by 20 m
Size of panels = 5 m by 5 m
Loading class = 4 kN/m^2
Materials : M 20 grade concrete, Fe 415 HYSD bars

14. a) Design a isotropically reinforced concrete slab of size 5.25 m × 4.50 m which is free on one of the shorter sides and continuous on the remaining three, for a live load of 2 kN/m^2 and finish load of 0.7 kN/m^2. The materials to be used are M20 concrete and HYSD steel of grade Fe 415. The environmental exposure may be taken to be mild. Adopt k = 1.32.

(OR)

b) An isotropically reinforced equilateral triangular slab is subjected to uniformly distributed load W_u per unit area. Any restraining moment is equal to positive moment. Calculate ultimate load when the slab is (i) simply supported an all the three edges, (ii) fixed on one edge, (iii) fixed on two edges, (iv) completely fixed on all edges.

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.

PART – C **(1×15=15 Marks).**

16. a) Design the consideration of the Rectangular and Circular water tanks both are above 100 feets from the ground level. Write the merits and demerits of the same.

(OR)

b) Explain in detail the classification of walls and mention how to improve the effective height of walls and columns with suitable examples.