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CIVIL

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**Question Paper Code : 50292**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017  
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 and IS 1905 is permitted.

Use M30 Grade of concrete and Fe 415 Steel Wherever required.

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. What is the function of retaining wall ?
2. What is called surcharge ?
3. What are the forces acting on walls of water tanks.
4. What is a ring beam ?
5. Mention the standard requirement for rise and tread of residential buildings and public building.
6. When do you prefer box culverts ?
7. What are the characteristics of yield line ?
8. What are upper bound and lower bound theorems ?
9. List out the types of bricks masonry walls.
10. What are the permissible stresses to be considered for the design of brick column ?

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PART – B

(5×16=80 Marks)

11. a) Design a T-shaped cantilever retaining wall to retain earth embankment 3m high above ground level. The embankment is surcharged at an angle of  $16^\circ$  to the horizontal. The unit weight of earth is  $18\text{kN/m}^3$  and its angle of repose  $30^\circ$ . The safe bearing may be taken  $100\text{kN/m}^2$  at a depth of 1m below the ground. The coefficient of friction concrete and soil may be taken as 0.5. (16)

(OR)

- b) Design a counterfort retaining wall to retain 7m high embankment above ground level. The foundation is to be taken 1 m deep where the safe bearing capacity of soil may be taken as  $180\text{kN/m}^2$ . The top earth retained is horizontal and soil weighs  $18\text{kN/m}^3$  with an angle of internal friction is  $30^\circ$ . Coefficient of friction between concrete and soil may be taken as 0.5. (16)

12. a) Design an underground tank of size  $12\text{m} \times 5\text{m} \times 4\text{m}$  depth. The angle of repose of soil  $30^\circ$  and density of soil is  $16\text{kN/m}^3$ . The soil is saturated. (16)

(OR)

- b) Design a circular tank flexible base for capacity of 4 lakh litres of water. (16)

13. a) Design a dog-legged stair for the following data :

Height of floors = 3.4 m

The size of stair case =  $4.3\text{m} \times 4.3\text{m}$

Live load =  $2.5\text{kN/m}^2$

(16)

(OR)

- b) Design an interior panel of flat slab  $5.6\text{m} \times 6.6\text{m}$  to carry a live load of  $7\text{kN/m}^2$ . Provide two way reinforcement. (16)

14. a) Design a simply supported rectangular slab of  $4\text{m} \times 5\text{m}$  to carry a load of  $5\text{kN/m}^2$ , if the slab is isotropically reinforced using yield line theory. (16)

(OR)

- b) Calculate the ultimate moment of resistance of a simply supported slab  $6\text{m} \times 4.5\text{m}$  which is reinforced using 8 mm diameter bars spaced at 100 mm c/c. The thickness of slab is 125 mm. Also calculate ultimate collapse load from first principles. (16)

15. a) Design a brick wall to carry a load of  $40\text{kN/m}$ . The height of wall is 3m. Strength of brick is  $10\text{N/mm}^2$ . Use cement mortar ratio 1 : 6. (16)

(OR)

- b) Determine the allowable axial load on brick masonry column  $300\text{mm} \times 500\text{mm}$  constructed using cement mortar of 1 : 6. The height of column is 5 m. strength of brick is  $9\text{N/mm}^2$ . (16)