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Question Paper Code: 45101

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Fifth Semester

Civil Engineering

14UCE501 - DESIGN OF REINFORCED CEMENT CONCRETE AND MASONRY
STRUCTURES

(Regulation 2014)

(Use of IS456-2000, IS 1905-1987 and SP16-1980 are permitted)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- In working stress method, the modular ratio ' m ' for M20 grade of concrete is
(a) 11 (b) 9.33 (c) 13.33 (d) 18.67
- Partial safety factor for concrete in limit state method is
(a) 1.2 (b) 1.15 (c) 1.4 (d) 1.5
- In singly reinforced beams, steel reinforcement is provided in
(a) tensile zone (b) compressive zone
(c) both (a) and (b) (d) neutral zone
- The design bond stress of plain bars in tension in M30 grade of concrete is
(a) 1.5 (b) 1.2 (c) 1 (d) 1.4
- The analysis of slab spanning in one direction is done by assuming it to be a beam of
(a) 1 m length (b) 1 m width
(c) 1 m² area (d) none of these

6. The minimum flexural reinforcement in slabs with Fe 415 is
(a) 0.15% of gross area (b) 0.12% of gross area
(c) 0.14% of gross area (d) 0.16% of gross area
7. The slenderness ratio of a RCC long column is greater than
(a) 20 (b) 15 (c) 12 (d) 16
8. When the ratio of effective length of the column to its least lateral dimension does not exceed 12, it is termed as a
(a) long column (b) short column
(c) plain column (d) none of these
9. The permissible stress of masonry wall depend on
(a) slenderness ratio (b) compressive strength of mortar
(c) eccentricity of loading (d) all the above
10. The Name of the code used for the design of masonry structures is
(a) IS 456 (b) SP 16 (c) IS 1905 (d) IS 800

PART - B (5 x 2 = 10 Marks)

11. What are the various methods used in the design of RC structures?
12. Define under reinforced section.
13. Distinguish between one way slab and two way slab.
14. Sketch the critical section of one way shear in footing.
15. Classify the masonry walls based on their loading.

PART - C (5 x 16 = 80 Marks)

16. (a) Discuss about the limit state method as detailed in current IS code. Also state the advantages of limit state method over other methods. (16)

Or

- (b) Explain the procedure for design of Re-structures by using limit states method. (16)

17. (a) Design the reinforcements required for a rectangular beam section with the following data:
 Size of the beam section = $350\text{mm} \times 800\text{mm}$
 Factored shear force = 150 kN
 Factored torsion moment = 105 kNm
 Factored bending moment = 215 kNm
 Materials to be used are M20 and Fe 415 steel. (16)

Or

- (b) Design the flexural reinforcement for a beam by with size $250\text{mm} \times 400\text{mm}$ and that it has to carry in addition to the loads an udl of 10 kN/m and a dead load of 5 kN/m and point load of 30 kN placed at its midspan. Use M25 and Fe415.
 Take effective span = 6m (16)

18. (a) Design a two way slab for the following data: Size = $7\text{m} \times 5\text{m}$; Width of the supports = 300mm ; Edge condition = Two short edges are discontinuous; Live load = 5 kN/m^2 ; Floor finish = 1 kN/m^2 . Use M20 concrete and Fe415 steel. (16)

Or

- (b) Design a R.C slab $6.3\text{ m} \times 4.5\text{ m}$ simply supported on all the four sides. It carries a live load of 10 kN/m^2 in addition to dead load. Use M20 Concrete and Fe415 steel. (16)

19. (a) Design the longitudinal and lateral reinforcement in a rectangular reinforced concrete column of size $300\text{mm} \times 400\text{mm}$ subjected to a design ultimate load of 1200 kN and an ultimate moment of 200 kNm with respect to the major axis. Adopt M20 grade of concrete and Fe415 steel. (16)

Or

- (b) Design a suitable footing for the column of size $300\text{ mm} \times 500\text{ mm}$ supporting a service load of 1000 kN . Assume SBC of soil as 200 kN/m^2 . Use M20 concrete and Fe415 steel. (16)

20. (a) Design an interior wall of a two storeyed building to carry 125mm thick RCC slabs with 3.1m ceiling height. The wall is unstiffened and supports a 2.65m wide slab.
 Live load on the roof = 2 kN/m^2
 Live load on the floor = 2 kN/m^2
 Weight of 80mm thick terrace = 2 kN/m^2
 Weight of floor finish = 2 kN/m^2 . (16)

Or

- (b) Design the exterior wall of a building to carry 100 mm thick RC slab of 3 m ceiling height and support conditions is fixed, restrained. Live load on roof is 2 kN/m^2 . Assume crushing strength of brick unit as 10 N/mm^2 . Mortar type is M₁ mortar.

(16)
