Reg. No. :

Question Paper Code: 41151

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

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)

1. 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

2. Partial safety factor for concrete in limit state method is

    (a) 1.2   (b) 1.15   (c) 1.4   (d) 1.5

3. The maximum spacing of vertical shear reinforcement in beams shall not exceed

    (a) 0.5 times effective depth   (b) 0.75 times effective depth
    (c) 0.4 times effective depth   (d) 0.6 times effective depth

4. 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

5. The behaviour of one way slab of unit width in flexure is similar to the behaviour of

    (a) column   (b) footing   (c) beam   (d) wall

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. The ultimate moment for design of flexural reinforcement in an isolated footing is calculated at

    (a) footing edge

    (b) column face

    (c) distance equal to 0.5 times effective depth from column face

    (d) distance equal to effective depth from column face

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 effective length of a masonry wall which is supported at each end by cross wall is

    (a) 0.5 L   (b) 1.5 L   (c) 1 L   (d) 2 L

PART - B (5 x 2 = 10 Marks)

11. What is the concept of limit state of design.

12. State the expression for effective flange width for simply supported T beams.

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) A doubly reinforced rectangular concrete beam is to be designed to have overall dimensions of 250*mm* by 600*mm* with an effective span of 6*m*. The beam is simply

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supported and has to support an uniformly distributed load of 25*kN/m*. Adopting M25 and Fe 500, design the suitable reinforcements in the beam by working stress method. (16)

17. (a) Design the flexural reinforcement for a beam by with size 250*mm* x 400*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 =6*m*. (16)

Or

(b) Design the reinforcements required for a rectangular beam section with the following data:
Size of the beam section=*350mm * 800mm*
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)

18. (a) Design a two way slab for the following data: Size = 7*m* x 5*m*; Width of the supports = 300*mm*; 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 dog-legged staircase for an office building, given the following data:
Height between floor = 3.2*m*;
Riser = 160mm, Tread = 270*mm*;
Width of flight = landing width = 1.25*m*;
Live load = 5kN/m^2;
Finishes load = 0.6kN/m^2
Assume the stairs to be supported on 230mm thick masonry walls at the outer edges of the landing, parallel to the risers. Use M20 concrete and Fe415. (16)

19. (a) Design the longitudinal and lateral reinforcement in a rectangular reinforced concrete column of size 300*mm*x400*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

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(b) A reinforced concrete column 400mmx400mm supports an axial service load of 1000kN. The safe bearing capacity of the soil is 200kN/m^2. Adopting M-20 grade concrete and Fe-415 HYSD bars design a suitable footing for the column and sketch the details of reinforcements.   (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) What are the factors to be considered while designing the brick masonry with respect to stability and lateral supports on the structure? Explain them in detail.

(16)

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