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Question Paper Code: 35101

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

Fifth Semester

Civil Engineering

01UCE501 – DESIGN ON REINFORCED CEMENT CONCRETE AND MASONRY STRUCTURES

(Regulation 2013)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

(Use of M20, Fe415, IS 456:200 and SP 16 design Aids are permitted, assume data for any other)

PART A - (10 x 2 = 20 Marks)

1. What are the advantages of elastic method of design?

2. State the limit state of philosophy.

3. Define the modes of cracking under shear.

4. Differentiate the singly and doubly reinforced beam.

5. Write the few types of staircases.

6. List the classification of stair.

7. Write any two situations in which combined footings are preferred to isolated footing.

8. Under what circumstances combined footing is necessary.

9. What is the purpose of providing a lateral support in a masonry structure?

10. Define slenderness ration of a masonry wall.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain the advantages of limit state method over other methods.   (10)

    (ii) List the assumptions of working stress method.   (6)

Or

(b) Explain briefly about the concept of ultimate load method and limit state method.

(16)

12. (a) Discuss briefly about the design requirement for bond and anchorage in RC beam design as per IS code and also write note briefly on serviceability requirements. (16)

Or

(b) Design a *T*-beam for an office floor using following data: Effective span = 8*m*, spacing between *T* beams = 3*m*, live load and floor finish are *4kN/m²* and 0.6 *kN/m²* respectively and also slab thickness = 150*mm*. Draw a reinforcement details. (16)

13. (a) Design a rectangular slab 5 *m* by 4 *m* in size and simply supported at the edges to support a service load of 4 *kN/m²*. Assume coefficient of orthotropy (μ) as 0.7. Adopt M-20 grade concrete and Fe-415 HYSD bars. (16)

Or

(b) Design a dog legged stair for a building in which the vertical distance between the floors is 3.6 *m*. the stair hall inner dimensions are 2.4 *m* x 5 *m*. The live load on the stair is 3000 *N/m²*. Adopt M-20 grade concrete and Fe-415 grade steel. (16)

14. (a) Design the reinforcements in a circular column of diameter 300 *mm* to support a service axial of 800 *kN*. The column has an unsupported length of 3 *m* and is braced against side away. The column is reinforced with helical ties. Adopt M-20 grade concrete and Fe-415 HYSD bars. (16)

Or

(b) Design and draw the reinforcement in a short column 400 *mm* x 600 *mm* subjected to an ultimate axial load of 1600 *kN* with ultimate moment of 120 *kNm* and 90 *kNm* about major and minor axis respectively. (16)

15. (a) Determine the safe axial load per meter length of a solid wall 230 *mm* thick. The height of the wall is 3.40 *m*. The wall is continuous at both ends between the cross walls of spacing 6*m*. *M1* mortar and bricks of compressive strength 7.5*MPa* are used.

(16)

Or

(b) Design a solid wall of a single story mill building that is 3000 *mm* in height , securely tied with floor and floor units and supporting two beams on either side of it. That exerts reactions of 30 *kN* and 20 *kN*. The thickness of the wall is 230 *mm*. The beam on the wall is 115 *mm*. Assume uniform bearing stress. (16)

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