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

Question Paper Code: 31151

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

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. Define limit state method. State the different limit states considered in the design.
2. State the limit state of philosophy.
3. Define the modes of cracking under shear.
4. Write the minimum and maximum area of tension reinforcement for beams.
5. Write any two various boundary conditions in the two way slab acting UDL.
6. Write the few types of staircases.
7. Explain in shortly braced and un-braced columns.
8. Under what circumstances combined footing is necessary.
9. Explain how the permissible stress on brick masonry is calculated.
10. List out any two factors which affect the permissible stress of masonry.

PART - B (5 x 16 = 80 Marks)

11. (a) A beam is simply supported over an effective span of 7 *m* carries a live load of 20 *kN/m*. Design and draw a reinforcement detailing for the beam. Assume width of section is equal to half the effective depth. (Working stress method) (16)

Or

(b) Design a rectangular reinforced concrete beam simply supported on masonry walls 300 *mm* thick with an effective span of 5 *m* to support a service load of 8 *kN/m* and a dead load of 4 *kN/m* in addition to its own weight. Adopt M-20 grade concrete and Fe-415 HYSD bars. Width of support of beams 300 *mm*. (16)

12. (a) 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 $4kN/m^2$ and 0.6 kN/m^2 respectively and also slab thickness = 150*mm*. Draw a reinforcement details. (16)

Or

(b) 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)

13. (a) Design a slab for an office building of size 4 *m* x 6 *m*, live load = 5 kN/m^2, floor finishes = 1.5 kN/m^2 and edge conditions are two adjacent edges discontinuous. Draw a reinforcement detailing for the slab. (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/m^2. Adopt M-20 grade concrete and Fe-415 grade steel. (16)

14. (a) Design a reinforced concrete footing for a rectangular column of section 300 *mm* by 500 *mm* supporting an axial factored load of 1500 *kN*. The safe bearing capacity of the soil is 185 kN/m^2. Adopt M-20 grade concrete and Fe-415 HYSD bars. (16)

Or

(b) Design a combined footing with strap beam for two reinforced concrete column of size 300 *mm* x 300 *mm* spaced 4 *m* centre to centre, and each supporting a service axial load of 500 *kN*. The safe bearing capacity of soil at site is 150 kN/m^2. Draw reinforcement detailing for the footing. (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 square masonry column of height 2000 *mm* to carry an axial load of 150 *kN*. The column is tied at top and bottom. Include the self-weight of the column for the design. (16)

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