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

Question Paper Code: 31511

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

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. Write the formula for the neutral axis depth factor in working stress design.
3. Define the modes of cracking under shear.
4. Enumerate the behavior of concrete with torsional reinforcement.
5. Write any two various boundary conditions in the two way slab acting UDL.
6. List the classification of stair.
7. Explain in shortly braced and un-braced columns.
8. Write any two situations in which combined footings are preferred to isolated footing.
9. Explain how the permissible stress on brick masonry is calculated.
10. What is the purpose of providing a lateral support in a masonry structure?

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

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

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) Design and draw reinforcement details of a rectangular beam of size 250 *mm* x 500 *mm*. The ultimate values of bending moment, shear force and torsion moment are 40 *kNm*, 40 *kN* and 30 *kNm* respectively. (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 and draw a suitable doglegged stair for a public building in which the vertical distance between floors is 3.6*m*. The stair hall measures 5 *m* x 2.5 *m*. The live load on the stair is 4 kN/m^2. (16)

14. (a) 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)

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 an interior cross wall to two storied building to carry 100 *mm* thick RCC slab with 3.0 *m* ceiling height. The wall is un-stiffened and its supports a 2.65 *m* wide slab. The live load on roof – 1.50 kN/m^2, live load on floor – 2.0 kN/m^2, weight of 80 *mm* thick terrace – 1.96 kN/m^2. Weight on floor finish - 0.20 kN/m^2. (16)