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

Question Paper Code: 31151

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

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. Enumerate the behavior of concrete with torsional reinforcement.
5. Write the minimum and maximum area of tension reinforcement for beams?
6. List the classification of stair.
7. Write the few types of staircases.
8. Differentiate between uniaxial and biaxial bending.
9. Explain how the permissible stress on brick masonry is calculated.
10. Define slenderness ration of a masonry wall.

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) 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 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 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)
