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

Question Paper Code: 41151

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

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. Analysis of reinforced concrete can be done by

   (a) straight line theory (b) elastic theory
   (c) ultimate load theory (d) all the above

3. Shear reinforcement is provided in the form of

   (a) vertical bars (b) inclined bars
   (c) combination of vertical and inclined bars (d) any one of these

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 analysis of slab spanning in one direction is done by assuming it to be a beam of

   (a) l *m* length (b) l *m* width
   (c) 1 m^2 area (d) none of these

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. When the ratio of effective length of the column to its least lateral dimension does notexceed12, it is termed as a

(a) long column (b) short column
(c) plain column (d) none of these

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 Name of the code used for the design of masonry structures is

(a) IS 456 (b) SP 16 (c) IS 1905 (d) IS 800

PART - B (5 x 2 = 10 Marks)

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

12. Define under reinforced section.

13. Distinguish between one way slab and two way slab.

14. What is axially loaded column?

15. Classify the masonry walls based on their loading.

PART - C (5 x 16 = 80 Marks)

16. (a) A R.C beam of size 250 *mm* x 500 *mm* is provided with 3 bars of 10 *mm* dia and a cover of 50 *mm*. The beam is subjected to a moment of 30 *kNm*. The concrete and steel used in the beam are M20 concrete and Fe415 HYSD bars respectively. Determine the stresses in concrete and steel. (16)

Or

(b) Discuss about the limit state method as detailed in current IS code. Also state the advantages of limit state method over other methods. (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) Find the moment of resistance of a singly reinforced concrete beam of 200 *mm* wide and 400 *mm* effective depth, reinforced with 3 bars of 16 *mm* dia. of Fe 415 steel. Take M20 concrete. (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 R.C slab 6.3 *m* x4.5 *m* simply supported on all the four sides.It carries a live load of 10 kN/m^2 in addition to dead load.Use M20 Concrete and Fe415 steel. (16)

19. (a) Design a suitable footing for the column of size 300 *mm* x 500 *mm* supporting a service load of 1000 *kN*. Assume SBC of soil as 200 kN/m^2. Use M20 concrete and Fe415 steel. (16)

Or

(b) A reinforced concrete column 400mmx400mm supports an axial service load of 1000*kN*. 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 the exterior wall of a building to carry 100 *mm* thick RC slab of 3 *m* ceiling height and support conditions is fixed, restrained. Live load on roof is 2 kN/m^2. Assume crushing strength of brick unit as 10 N/mm^2. Mortar type is M_1 mortar. (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)