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

Question Paper Code: 31511

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

Fifth Semester

Civil Engineering

01UCE501 - DESIGN OF REINFORCED CEMENT CONCRETE AND MASONRY STRUCTURES

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

(Permitted IS 456 : Zero and SP 16 Design Aids, assume any other data)

PART A - (10 x 2 = 20 Marks)

1. What are the advantages of using high yield strength deformed bars in RC construction?
2. Define modular ratio.
3. What are the reasons to provide minimum shear reinforcement?
4. List out the factors that affect the short term deflection.
5. How to calculate the effective span of the continuous slab?
6. Write any two guide line for fixing dimensions of components parts of stairs.
7. What are the basic assumptions while designing the short column under axial compression at collapse?
8. When the mat foundation can be provided?
9. What is the size of the modular brick?
10. What is the maximum stress in the foundation of a masonry wall?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Differentiate working stress method with limit state method. (8)

(ii) State the advantages and disadvantages of RCC. (8)

Or

(b) Design a rectangular beam section subjected to a moment of 100 *kNm*. Consider concrete of grade M20 and steel of grade Fe415. (16)

12. (a) Design the torsional reinforcement in a rectangular beam section, 350 *mm* wide and 750 *mm* deep, subjected to an ultimate twisting moment of 140 *kNm*, combined with ultimate (hogging) bending moment of 200 *kNm* and an ultimate shear force of 110 *kN*. Assume M25 concrete, Fe415 steel and mild exposure condition. (16)

Or

(b) A RC beam of size 200 *mm* x 400 *mm* deep is cast monolithically with slab 110 *mm* thick. The beam is simply supported over a span of 4.2 *m* and spaced 2 *m c/c*. Concrete mix M20 and yield strength deformed bars having yield stress of 415 N/mm^2 have been used. Calculate the maximum uniformly distributed load of the beam can carry and the corresponding area of steel. Assume effective cover of 65 *mm*. (16)

13. (a) Design a simply supported RC slab for a room measuring 6.5 *m* x 5 *m*. The width of support is 250 *mm*. The slab carries superimposed load of 3 kN/m^2. Use M20 grade of concrete and mild steel reinforcement. (16)

Or

(b) Design a dog legged stair for a building in which the vertical distance between floors is 3.6 *m*. The stair hall measures 2.5 *m* x 5 *m*. Use M20 concrete and Fe 415 steel bars. (16)

14. (a) Design the reinforcement in a spiral column of 400 *mm* diameter subjected to a factored load of 1500 *kN*. The column has an unsupported length of 3.4 *m* and is braced against sideway. Use M25 concrete and Fe 415 steel. (16)

Or

(b) Design a reinforced concrete footing for a 230 *mm* thick masonry wall which supports a load of 200 *kN/m* (inclusive of self weight) under service loads. Assume a

safe soil bearing capacity of 150 kN/m^2 at a depth of 1m below ground. Assume M20 grade concrete and Fe415 grade steel. (16)

15. (a) Design of brick column 3 m high to carry an axial load of 110 kN. Width of the pier is limited to 1.5 nominal brick size for architectural reasons. Assume cement lime mortar 1:1:6 and first class brick 10 Mpa strength; column may be taken as fixed restrain. (16)

Or

(b) Determine the allowable axial load per meter length of 200 mm solid wall. Height of wall between thicker plinth wall and slab is 3.5 m. Wall is continuous and length between cross wall is 5 m. Take basic compressive stress $f_b = 0.55\ N/mm^2$. (16)

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