

1025**Code : 15CE51T**Register
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V Semester Diploma Examination, Oct./Nov.-2019**DESIGN OF REINFORCED CEMENT CONCRETE****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) IS 456-2000 & sp-16 permitted.
(ii) In design problems A_{st} is calculated by using tables of sp-16.
(iii) Assume missing data suitably.

PART - A

Answer any five questions.

1. What is meant by 'limit state' ? List the different 'limit states'. 5
2. What is development length ? Explain. 5
3. Define :
 - (i) Neutral axis
 - (ii) Effective depth
 - (iii) Partial safety factor
 - (iv) Side face reinforcement
 - (v) Nominal cover 5
4. Differentiate between one way slab and two way slab. 5
5. Mention the section at which (i) Bending Moment, (ii) One way shear, (iii) Two way shear occurs in case of a square footing with neat sketch. 5
6. Differentiate between pre-stressed concrete & reinforced cement concrete. 5
7. What is the necessity of using high strength ? Steel & high strength concrete in pre-stressed concrete ? 5
8. What is Post-tensioning system ? List the types of Post-tensioning systems. 5

PART - B

Answer any five questions, at least two questions from each Section.

SECTION - I

9. A simply supported beam 250 mm × 500 mm in section is reinforced with 4 No. 16 mm dia with an effective cover of 50 mm. Effective span 6 m. Assuming M20 concrete & Fe415 steel determine the safe point load that can be carried by the beam in addition to its self weight. 15

10. Determine the reinforcement required for a beam having width 300 mm & overall depth 600 mm. Factored moment 320 kN-m. Take cover 25 mm & dia of bar as 25 mm. Use M15 concrete & Fe415 steel. 15
11. A simply supported T-beam of span 3.6 m consists of 120 mm thick slab supported by beams at 3 m centre to centre. The width and depth of web is 300 mm \times 500 mm. It consists of 8 No. of 20 mm dia as tensile reinforcement. Determine the moment of resistance of the T-beam. Use M20 concrete & Fe415 steel with effective cover of 40 mm 15

SECTION - II

12. A rectangular simply supported beam of 250 mm width supported on two masonry wall 230 mm thick and 6 m apart. The beam has to carry L.L of 10 kN/m & D.L of 5 kN/m in addition to its own weight. Design the beam for flexure. Take M25 concrete, Fe415 steel clear cover 30 mm dia of bar 25 mm & l/d ratio as 15. Sketch the reinforcement details in C/S. 15
13. Design a waist slab type dog legged stair case for an office building for the given data.
- Height between floor = 3.2 m, Riser = 160 mm, Tread = 270 mm, Width of flight & landing = 1.25 m, Live load = 5.0 kN/m², Finishes load = 0.6 kN/m².
- Assume the stair to be supported on 230 mm thick bearing at the outer edges of the landing parallel to the riser. Use M20 concrete & Fe415 steel. Take cover 20 mm, main bar 16 mm dia. Sketch the reinforcement details in L.S. 15
14. Design a simply supported slab to cover a room of size 4.0 m \times 5.0 m and 230 mm thick brick walls and around. L.L of 3 kN/m² and a finished load of 1 kN/m². Use M20 & Fe415 steel. Assume that the slab corners are free to lift. Sketch the reinforcement details at plan. 15
15. Design the column of size 300 mm \times 400 mm has an unsupported length of 3 m. It is subjected to axial factored load of 1100 kN. Using M25 concrete and Fe415 steel. Assume $d' = 60$ mm. Sketch the reinforcement details. 15