1520

Code : 15CE51T

Register Number | | | | | | | |

V Semester Diploma Examination, Nov./Dec. 2017

DESIGN OF REINFORCED CEMENT CONCRETE

Time : 3 Hours | **| Max. Marks : 100**

Note : IS 456-2000 & SP-16 is permitted.

PART – A

Answer any **five** questions : **5 × 5 = 25**

1. List the basic assumptions of design for limit state of collapse in flexure. **5**

2. Explain partial safety factors and design strength. **5**

3. Define Neutral axis, lever arm, effective depth, singly reinforced and doubly reinforced beam. **5**

4. Differentiate between one way slab and two way slab. **5**

5. Differentiate between short column and long column. **5**

6. Mention the advantages of pre-stressed concrete. **5**

7. Differentiate between pre-stressed concrete and reinforced cement concrete. **5**

8. Explain pre-tensioning system with a neat sketch. **5**

PART – B

Answer any **five** questions, atleast **two** questions from each section. **5 × 15 = 75**

SECTION – I

9. An R.C.C. rectangular beam of 300 × 600 mm overall is reinforced with 3 bars of 20 mm ϕ. It is S.S. over an effective span of 5 m. What is the maximum UDL can be allowed on the beam excluding self weight. Take effective cover 50 mm. Use M 20 & Fe500 steel. **15**

10. A doubly reinforced beam of 250 × 500 mm overall has to carry a maximum B.M. of 175 kN-m under working condition. Find the area of tension and compression reinforcement. Use M 20 & Fe500 steel. Take an effective cover of 40 mm on both sides. **15**

11. A T-beam of width 250 mm and rib depth 450 mm is S.S. over an effective span of 6 m. The thickness of flange is 125 mm. It is reinforced with 6 bars of 16 mm ϕ as tension steel with clear cover of 25 mm. Use M 20 concrete and Fe415 steel. Find the ultimate M.R. of the beam section and super imposed UDL. **15**

SECTION – II

12. Design a Lintel over the opening 2.5 m wide to carry brick masonry of height 3.25 m. Thickness of wall is 300 mm, bearing 300 mm. Use M 20 grade concrete and Fe415 steel. Take unit weight of concrete and B.B.M. as 25 kN/m^3 & 19.2 kN/m^3 respectively. **15**

13. Design one of the flight of stairs of school building spanning between landing beams to suit the following data :
    Type of staircase : Waist slab type
    No. of steps in flight = 12. Tread T = 250 mm, Riser R = 150 mm, Width of landing beams = 300 mm.
    Use M 20 concrete and Fe415 steel. Adopt L.L = 5 kN/m^2 & floor finish = 1 kN/m^2. Sketch the reinforcement details. **15**

14. Design a slab over a room of clear dimension 3 m × 8 m supported on 300 mm thick brick wall. The L.L. on slab is 2.5 kN/m^2 and floor finish 1 kN/m^2. Take M 20 concrete & Fe415 steel. Sketch the reinforcement details. **15**

15. Design a square footing to carry column load of 1000 kN from a 350 mm square column. The bearing capacity of soil is 120 kN/m^2. Use M 20 concrete & Fe500 steel. Check for shear. **15**