

**1014****Code : 15CE51T****Register  
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**V Semester Diploma Examination, April/May-2019****DESIGN OF REINFORCED CEMENT CONCRETE****Time : 3 Hours ]****[ Max. Marks : 100****Instruction :** IS 456-2000 & SP16 is permitted.**Published By:****PART – A**Answer any **five** questions.**5 × 5 = 25**

1. What are serviceability requirements satisfied by designing an R.C. structure ? **5**
2. Explain characteristic strength of material and characteristic load. **5**
3. Define moment of resistance & effective depth. **5**
4. Differentiate between under reinforced section and balanced section. **5**
5. What are the advantages of T-beam over a rectangular beam ? **5**
6. Explain the principle of prestressing. **5**
7. Differentiate between pre-tensioned and post-tensioned. **5**
8. Distinguish between RCC and PSC. **5**

**PART – B**Answer any **five** questions, atleast **two** questions from each section.**5 × 15 = 75****Section-I**

9. A RCC beam of rectangular section 300 × 550 mm overall is reinforced with 20 mm dia & numbers of bars at an effective cover of 40 mm. Effective span of beam is 5.8 m. Determine the safe udl the beam can carry and also find the super imposed load the beam can carry. Use Fe415 grade steel and M20 grade concrete. **15**

10. Determine the ultimate moment of resistance of doubly reinforced beam of rectangular section having a width of 250 mm and reinforced with 5 bars of 25 mm diameter at a effective depth of 550 mm. The compression steel is made up of 25 mm diameter, two numbers at an effective cover of 60 mm. Adopt M20 & Fe415 concrete and steel respectively. Also find the safe load the beam can carry over an effective span of 6 m. 15
11. A T-beam of depth 500 mm has a flange width of 1200 mm. It is reinforced with 6-20 mm  $\phi$  bars on tension side with a cover of 30 mm. If M20 concrete and Fe415 steel are used, calculate moment of resistance of beam. Take  $b_w = 300$  mm & Depth of flange = 120 mm. 15

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### Section-II

12. A singly reinforced beam  $300 \times 450$  mm overall is supported on brick piers  $300 \times 300$  mm, 4 m apart, Find the necessary tension reinforcement to enable the beam to carry a superimposed load of 12 kN/m in addition to its own weight. Take M20 grade concrete and Fe415 steel. 15
13. The floor of a classroom is  $3 \text{ m} \times 5 \text{ m}$ . The edges of the slab are simply supported and the corners are not held down. The live load on the slab is  $2.5 \text{ kN/m}^2$ . The slab has bearing of 150 mm on the supporting walls. Design the slab. Use M20 grade concrete and Fe415 steel. 15
14. Design a doglegged staircase for a building in which the height of floor is 3 m. The hall dimension is  $3 \text{ m} \times 5 \text{ m}$ . Live load may be taken as  $3 \text{ kN/m}^2$ . Use M20 grade concrete and Fe415 steel. The stairs are supported on 230 mm walls. Adopt rise = 150 mm & tread = 225 mm. 15
15. Determine the reinforcement of grade Fe415 steel required for a square column of size  $300 \times 300$  mm subjected to factored load of 2000 kN and factored moment 250 kN-m. Take cover as 30 mm. Use M20 grade concrete. 15