

**6424**  
**BOARD DIPLOMA EXAMINATION**  
**MARCH/APRIL - 2019**  
**\* DIPLOMA IN CIVIL ENGINEERING**  
**REINFORCED CONCRETE STRUCTURES**  
**FOURTH SEMESTER EXAMINATION**

**Time: 3 Hours**

**Total Marks: 80**

**PART - A (3m x 10 = 30m)**

*Note 1: Answer all questions and each question carries 3 marks*

*2: Answers should be brief and straight to the point and shall not exceed 5 simple sentences*

*3. Use of code books IS: 456-2000 & IS: 875-1987 are permitted.*

1. State the methods of design of Reinforced concrete structures
2. What is the role of partial safety factor in limit state design? Write partial safety factor values for concrete and steel as per IS456 - 2000
3. Define development length and write the expression for development length with usual notations.
4. The dimensions of a single reinforced simply supported rectangular beam are 300 mm wide and 450 mm deep effective, provided with Fe 415 grade steel and M20 grade concrete. Determine the limiting moment of resistance of the beam
5. Explain where and how do you provide torsion reinforcement in two way restrained slabs
6. State the IS code provisions for limiting vertical deflections for different types of beams/slabs
7. Find effective flange width of a simply supported T beam with the following details  
 \* Effective span = 5.5m  
 Centre to centre distance of adjacent panels = 4m  
 Breadth of web = 300mm  
 Thickness of slab = 120mm
8. Write the advantages of continuous beam with the respect to stiffness as compared to single span beam
9. Draw the line diagram of a continuous beam and indicate salient points with bending moment equations at the middle of end span and interior span
10. A short axially loaded column of size 300 x 350 mm is reinforced with 8 bars of 20 mm diameter. Use M30 concrete and Fe 415 steel. Calculate the load carrying capacity of column

**PART - B      (10m x 5 = 50m)**

Note 1: Answer any five questions and each carries 10 marks

2: The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

3. Assume missing data, If any suitably

11. A reinforced concrete beam 230 mm X 500 mm overall depth is reinforced with 4 bars of 16 mm diameter at an effective cover of 40mm. What uniformly distributed load this beam can carry excluding self weight, over a simply supported span of 5m. Assume M20 concrete and Fe 415 steel. Use working stress method
12. A singly reinforced concrete beam section 300X550 mm overall is reinforced with 5 bars of 12mm diameter with an effective cover of 50 mm. Find the moment of resistance of the beam. Use M25 grade concrete and Fe 415 steel. Use limit state method
13. A doubly reinforced beam of width 300 mm and 600 mm effective depth is reinforced with three bars of 16 mm diameter in compression zone and 5 bars of 20 mm diameter in tension zone. Find the ultimate moment of resistance of the section. Effective cover is 40 mm for both the steels. Concrete grade is M25 and steel is Fe 415
14. Design a simply supported RCC slab for a room of clear dimensions 2.7 X 8m. Width of supports is 250 mm. Superimposed load is 2 kN/Sq. m and weight of finishes is 1.0 kN/Sq. m. Use M 25 concrete and HYSD bars of Fe 415 grade. Also check the design for deflection
15. A T beam of effective flange width 750mm, thickness of slab 120mm, width of rib 250mm, and effective depth 450mm, is reinforced with 3500Sq.mm of tension steel. Calculate the moment of resistance of the section. M20 grade concrete and Fe415 bars are used
16. A continuous RCC rectangular beam of size 230 mm X 450 mm overall is supported on 230X 230 mm RCC columns at clear intervals of 3 m. The beam carries a dead load of 12 kN/m including its self weight and an imposed load of 8kN/m. Design the reinforcement at the support next to end support. Use M20 grade concrete and Fe 415 grade steel
17. . Design a short Reinforced Concrete rectangular column with one side as 230mm to carry an axial load of 2000 kN. Use M30 concrete and Fe 415 steel
18. List and explain the steps for design of isolated square footing of uniform thickness

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