



c14-c-501

**4618**

**BOARD DIPLOMA EXAMINATION, (C-14)**

**MARCH/APRIL—2021**

**DCE - FIFTH SEMESTER EXAMINATION**

**DESIGN AND DETAILING OF RC ELEMENTS**

Time : 3 hours ]

[ Total Marks : 80

**PART—A**

4×5=20

- Instructions :** (1) Answer *any five* questions.  
(2) Each question carries **four** marks.  
(3) Assume suitable data if necessary.  
(4) IS 456:2000 and SP-16 Codes are allowed.

1. Define characteristic loads as per IS 456 : 2000.
2. List various limit states to be considered in limit state method as per code.
3. Define the term 'effective span' for a simply supported beam as per code.
4. Write the value of maximum shear stress in concrete for M20 grade as per IS 456.
5. State the IS code provisions for limiting stiffness values for different types of slabs up to span of 10 m.
6. What are the design requirements for minimum reinforcement of slabs as per IS 456?
7. When  $X_u < D_f$  and  $D_f/d$  ratio does not exceed 0.2, write the formula for calculating moment of resistance for T-beam as per IS 456-2000.
8. What are the advantages of continuous slab?

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9. Sketch three span of continuous slabs and mark the points, where the tension reinforcement is to be provided.
10. What are the specifications for lateral ties in a column?

### PART—B

15×4=60

- Instructions :** (1) Answer *any four* questions.  
(2) Each question carries **fifteen** marks.  
(3) Assume M20 grade concrete and Fe415 grade for steel unless specified.  
(4) Answer all questions using limit state method unless specified.
11. Define under-reinforced, over-reinforced and balanced sections in working stress method.
12. State the assumptions made in the design of flexural members (beams) in limit state method as per code.
13. Find the ultimate moment of resistance of singly-reinforced rectangular beam 200 mm × 400 mm, effective depth reinforced with 3 bars of 20 mm diameter. Use M20 grade concrete and Fe415 steel.
14. With the help of a neat sketch show the reinforcement details for any type of slab.
15. A T-beam of effective flange width 1200 mm, thickness of slab 100 mm, width of web 300 mm, and effective depth of 460 mm is reinforced with an area of 450 mm<sup>2</sup>. Find whether the N-A lies in the flange or web. Take  $f_{ck} = 20\text{N/mm}^2$  and  $f_y = 415\text{ N/mm}^2$ .
16. Calculate the maximum BM at the support next to the end support for a continuous beam using IS 456  
Effective span = 4 m ; Factored dead load = 22 kN/m ; Factored live load =12 kN/m.
- \* 17. Calculate the load carrying capacity for a square column of size 400 mm × 400 mm provided with a steel area of 200 mm<sup>2</sup>. Use M20 and Fe 415 grades of concrete and steel respectively.
18. Define footing and state different types of footings.

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