



c09-c-402

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**BOARD DIPLOMA EXAMINATION, (C-09)
APRIL/MAY—2015
DCE—FOURTH SEMESTER EXAMINATION
RC STRUCTURES**

Time : 3 hours]

[*Total Marks* : 80

PART—A

3×10=30

- Instructions** : (1) Answer **all** questions.
(2) Each question carries **three** marks.
(3) Answer should be brief and straight to the point and shall not exceed *five* simple sentences.
(4) Candidates are allowed to use IS 456–2000 Code Book.

1. What is the role of partial safety factor in limit state design?
2. State any three advantages of limit state method over working stress method.
3. Calculate the development length in tension for Fe-250 bar of 25 mm diameter and M-20 concrete.
4. Find the depth of neutral axis of singly reinforced rectangular beam 230 mm × 400 mm effective depth, reinforced with 4 bars of 12 mm diameter. Grade of concrete is M-20 and grade of steel is Fe-415. Use limit state method.
5. State the IS code provisions for design of torsion reinforcement in two-way corners held down slab.
6. Mention two purposes of distribution steel in one-way slab.

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7. State the formulae for calculating effective flange width of T-beams and isolated T-beams. 1½+1½
8. Calculate shear force at outer side of support next to end support for a continuous beam as per IS 456-2000. Size of beam is 300 mm × 450 mm overall. Effective span = 3.5 m, imposed load (not fixed) = 10 kN/m, imposed load (fixed) = 12 kN/m excluding self-weight. Effective cover 40 mm.
9. State the advantages of a continuous beam.
10. What are the specifications for lateral ties in a column?

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

(4) Assume suitable data wherever necessary.

11. A singly reinforced rectangular concrete beam of size 300 mm × 500 mm (effective depth) is reinforced with 4 nos. of 16 mm diameter HYSD bars. Find the moment of resistance of the beam section using working stress method. Take grade of concrete as M-20 and grade of steel as Fe-415.
- * 12. A singly reinforced concrete beam section of 300 mm × 550 mm overall is reinforced with 5 bars of 16 mm diameter with an effective cover of 50 mm. The beam is simply supported over an effective span of 5 m. Find the uniformly distributed load the beam can carry including its self-weight. M-20 grade concrete and Fe-415 steel are used. Use limit state method.
13. Design a simply-supported singly-reinforced rectangular RC beam for flexure over a clear span of 6 m. The superimposed load is 30 kN/m and width of supports is 320 mm each. Use M-20 grade concrete and Fe-415 steel. Check the design for deflection.

14. Design a simply supported RCC slab for a room of clear dimensions 2.5 m × 8 m, width of supports being 250 mm. Superimposed load is 2 kN/sq m and weight of finishes is 0.6 kN/sq m. Use M-20 concrete and HYSD bars of Fe-415 grade. Check for maximum spacing of main and distribution bars as per IS 456-2000.
15. A T-beam of effective flange width 1200 mm, thickness of slab 100 mm, width of rib 300 mm and effective depth 460 mm is reinforced with 4 numbers of 16 mm diameter bars. Calculate the moment of resistance of the section. Use M-20 grade concrete and Fe-415 bars.
16. Design a singly reinforced continuous RC rectangular beam for flexure at middle of interior span with the following details :
- Number of spans = 3
 - Clear distance between supports = 3600 mm
 - Width of support = 300 mm
 - Imposed load (fixed) = 7.5 kN/m
 - Excluding self-weight and imposed load (not fixed)
= 5 kN/m
- Use M-20 concrete and Fe-415 steel.
17. Design a short reinforced concrete circular column with lateral ties to carry an axial load of 1000 kN. Use M-20 concrete and Fe-415 steel.
18. List and explain the steps for design of isolated square footing of uniform thickness to support an axially loaded square column.
