



c09-c-402

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**BOARD DIPLOMA EXAMINATION, (C-09)
OCT/NOV—2016
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) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. State the various loads to consider in RCC design.
2. State any three differences between working stress and limit state methods of design.
3. A singly reinforced concrete beam of size 230 mm × 450 mm effective is subjected to a factored shear force of 40 kN. Calculate the nominal shear stress in concrete.
4. Calculate the minimum and maximum areas of tension reinforcement for beam 300 mm × 500 mm effective dimensions, effective cover is 40 mm and Fe 415 bars are used.
5. Explain where and how do you provide torsion reinforcement in slabs.

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6. State the specifications for the spacing of main and distribution steel in slabs.
7. Find the effective flange width of following simply supported T-beam :
- Effective span = 5.4 m
c/c distance of adjacent panels = 3.0 m
Breadth of the web = 230 mm
Thickness of slab = 120 mm
8. Explain the advantages of continuous beam with respect to stiffness as compared to single-span beam.
9. 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.
10. State the failure mechanism of short and long columns.

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.

11. Design a rectangular RCC beam to resist a bending moment of 60 kNm in working stress method. Use M20 grade concrete and Fe 415 grade steel. Take effective depth to breadth ratio as 1 : 2 (i.e., $d = 2b$).
12. Determine the tension and compression steels required for a doubly reinforced rectangular beam with the following data. Overall size of beam = 250 mm × 550 mm, Factored moment = 250 kNm, Effective cover = 50 mm. Use M20 concrete and Fe 415 steel.

13. Design a RC lintel for flexure over an opening of 1.5 m wide. The height of brickwork above the opening is 2.5 m. Masonry weighs 19 kN/cum. The brick walls are 230 mm wide and lintel has a bearing of 200 mm on wall on either side. Use M20 grade concrete and Fe 415 steel.
14. Design a simply supported RCC slab for a room of clear dimensions 2.5 m × 8 m width of supports is 250 mm. Superimposed load is 2 kN/sq. m and weight of finishes is 0.6 kN/sq. m. Use M20 concrete and HYSD bars of Fe 415 grade.
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. M20 grade concrete and Fe 415 bars are used.
16. A continuous RCC rectangular beam of size 300 mm × 500 mm effective is supported on 300 mm × 300 mm RCC columns at 3 m intervals. The beam carries a dead load of 15 kN/m including its self-weight and imposed load of 10 kN/m. Design the reinforcement for the beam at the support next to end support.
17. Design a short reinforced concrete square column to carry an axial load of 2000 kN. Use M30 concrete and Fe 415 steel.
18. A RC column of size 300 mm × 300 mm carries a load of 750 kN. The safe bearing capacity of soil is 200 kN/m². Design an isolated square column footing of uniform thickness. Use M20 grade concrete and Fe 415 grade steel. Check for development length and check for bearing pressure are not required.
