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c09-c-402

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**BOARD DIPLOMA EXAMINATION, (C-09)
SEPTEMBER/OCTOBER - 2020
DCE—FOURTH SEMESTER EXAMINATION**

R. C. 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 types of steel used in RC members. Why steel is used as reinforcement?
2. Find the modulus of elasticity of concrete as per IS 456-2000 for M-25 concrete.
3. What are the types of bond? Write the anchorage value for a standard U-type hook.
4. List and sketch various forms of shear reinforcement in beams.
5. State the IS code provisions for design of torsion reinforcement in two-way corners held down slab.

- * 6. Write the code provisions for maximum spacing of bars in slabs.
7. List the advantages of T-beams.
8. What are the conditions to be satisfied to adopt the moment and shear coefficients values in IS 456-2000 for continuous beams/slabs?
9. Draw the line diagram of a continuous beam indicating salient points with BM values at middle of end span and interior span.
10. State any three code provisions for longitudinal reinforcement in the design of 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 criteria for valuation are the content but not the length of the answer.

11. Design a singly reinforced beam using M-20 concrete and Fe-415 steel to carry a total working load of 20 kN/m. The effective span of beam is 5 m. Adopt working stress method.
12. A singly reinforced rectangular beam 250 mm × 550 mm overall depth is reinforced with 4 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. A doubly reinforced beam simply supported over an effective span of 6 m has an effective depth of 400 mm and breadth of 250 mm. It is reinforced with 4 bars of 20 mm diameter in tension side and 4 bars of 12 mm in compression side. Concrete is M-20 grade and steel is Fe-415. Calculate its moment of resistance.

- * 14. Design an RCC one way slab to carry a live load of 3 kN/sq m and finishes of 1 kN/sq m on an effective span of 3.5 m. Use M-25 grade concrete and Fe-415 steel. Sketch the reinforcement details.
15. Calculate the moment of resistance of a T-beam with the following dimensions :
- Breadth of web = 300 mm
Breadth of flange = 1500 mm
Effective depth of beam = 500 mm
Depth of flange = 150 mm
Area of tension reinforcement = 4 nos. 20 mm
- Assume M-25 grade concrete and Fe-415 grade steel.
16. A continuous RCC rectangular beam of size 250mm 500mm overall is supported on 300 mm 300 mm masonry columns at clear interval of 4 m. The beam carries a dead load of 20 kN/m including its self-weight and imposed load of 12 kN/m. Concrete is M-20 grade and steel is Fe-415 grade. Design the reinforcement at (a) middle of end span and (b) middle of interior span.
17. Design a short column of circular section to carry an axial load of 1000 kN. Use M-20 concrete and Fe-415 steel.
18. An 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 M-20 grade concrete and Fe-415 grade steel. Check for development length and check for bearing pressure are not required.
