C09-C-402

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BOARD DIPLOMA EXAMINATION, (C–09)
MARCH/APRIL—2018
DCE—FOURTH SEMESTER EXAMINATION

REINFORCED CONCRETE 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.

(4) Use of IS 456—2000 and SP—16 is permitted.

1. Define the following terms :

   (a) Characteristic strength

   (b) Characteristic load

2. State any three differences between working stress methods and limit state method.

3. List any three assumptions made in the design of flexural members is limit state method.

4. What is the purpose of providing shear reinforcement in beams?

5. Distinguish between one-way slab and two-way slab.

6. What is torsional reinforcement? Where do you provide it?

7. What are the three advantages of tee beams over rectangular beams?

8. What are the three advantages of continuous slab?

9. Sketch a three span continuous slabs and mark the points, where the tension reinforcement is to be provided.

10. Define the terms : *(a)* short column and *(b)* long column.

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PART—B 10×5=50

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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 any suitable data required during solving the problems.

11. *(a)* State the assumptions made in the theory of design of flexural members using working stress.   4

    (b) Define *(i)* under reinforced, *(ii)* over-reinforced and *(iii)* balanced section, in design of flexural members in working stress method.   6

12. Calculate the ultimate of moment of resistance of an RC beam of rectangular section 230 mm wide and 410 mm overall depth. Steel reinforcement provided in the beam is 4 numbers of 16 mm bars in tension and 2 no. of 16mm bars in compression. Assume M 20 grade concrete and Fe 415 grade steel was used. Take an effective cover of 33mm, on both sides.

13. An RC beam of rectangular section 230 mm wide and 410 mm overall depth is reinforcement with 4 numbers of 20 mm bars in tension. If the section has to carry a design shear force of 50 kN, design the shear reinforcement required. Use M 20 grade concrete and Fe 415 grade steel and take an effective cover of 35 mm.

14. A simply supported RC slab is provided over a room of internal dimensions 3 m 7 m. Design the slab using M 20 grade concrete and Fe 415 grade steel by limit state method take. Support width-230 mm, live load 2 kN/m^2 and weathering course 1 kN/m^2.

15. Calculate the ultimate of moment resistance of a reinforced concrete T-beam of effective flange width of 1200 mm, thickness of slab is 120 mm, width of the rib is 230 mm, effective depth is 450 mm and is reinforced with 4 numbers of 16 mm   bars. Assume M 20 grade concrete and Fe 415 grade steel.

16. A singly reinforced continuous RC rectangular beam of size 230 mm 350 mm is subjected to a live load of 20 kN/m and a dead load of 15 kN/m including its self weight. Find the bending moment at all salient points along the beam.

   No. of spans   = 3
   Width of the supports = 230mm
   Clear span   = 3·5m

   Use M20 grade concrete and Fe 415 grade steel.

17. Design a short square column to carry an axial load of 1200 kN using M 20 grade concrete and Fe 415 grade steel.

18. Design a reinforced concrete footing of uniform thickness for a reinforced concrete column of 310 mm 310 mm size and carrying an axial load of 1000 kN, using M 20 grade concrete and Fe 415 grade steel. The safe bearing capacity of the soil is 180 kN/m^2.

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