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C09–C–402

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BOARD DIPLOMA EXAMINATION, (C–09)

MARCH/APRIL—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. Define characteristic strength and characteristic load.

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

3. List and sketch various forms of shear reinforcement in beams.

4. A singly reinforced concrete beam of size 230 mm 450 mm effective is subjected to a shear force of 40 kN under working loads. Calculate the nominal shear stress in concrete.

5. Draw the cross-section of a cantilever slab (sunshade) and show the reinforcement.

6. What are the functions of distribution steel in slabs?

7. State the formulae for calculating effective flange width of *T*-beams and isolated *T*-beams.

8. Explain the advantages of continuous beam with respect to stiffness as compared to single span beam.

9. Draw the line diagram of a continuous beam and indicate salient points with bending moment equations at the middle of end span and interior span.

10. State different enconditions of RCC 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. *(a)* State types of loads to be considered in the design of RCC members. 4

(b) Explain types of singly reinforced RCC sections as per working stress method. 6

12. An RCC beam 250 mm wide and 450 mm deep effective is reinforced with 6 bars of 16 mm diameter on tension side of which two bars are cranked up near the support. If the design shear force is 120 kN, design the shear reinforcement considering bent-up bars. Concrete is M20 grade and steel Fe415.

13. A singly reinforced concrete beam section 250 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 a span of 6 m. Find the uniformly distributed load the beam can carry excluding self-weight. Use M20 grade concrete and Fe 415 steel. Use limit state method.

14. Design the floor slab for a hall 4 m × 6 m to carry a live-load of 3 kN/sq. m and floor finish of 1 kN/sq.m. Walls are 300 mm wide. Use M20 grade concrete and Fe 415 steel. The corners of the slab are not held down.

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. M 20 grade concrete and Fe 415 bars are used.

16. Design a continuous one-way slab for an office floor. The slab is continuous over beams spaced at 3·5 m intervals. Width of beam is 230 mm, The superimposed load is 3 kN/sq.m. and floor finish is 1 kN/sq.m. Use M20 concrete and Fe 415 steel.

17. Design a short reinforced concrete rectangular column with one side as 230 mm to carry an axial load of 2000 kN. Use M30 concrete and Fe 415 steel.

18. An RC column of size 230 mm × 230 mm carreis a load of 1000 kN. The safe bearing capacity of soil is 150 kN / m^2. Design an isolated square column footing of uniform thickness. Use M30 grade concrete and Fe 415 grade steel. Check for development length and check for bearing pressure are not required.

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