C-09-C-**402**

3423

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH / APRIL - 2019

DCE - IV 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) Answer should be brief and straight to the point.
(4) I.S. 456 - 2000 code is allowed.

1 Distinguish between strength and serviceability limit states.

2 Find modular ratio of concrete as per IS 456-2000 for M30 concrete.

3 A singly reinforced concrete beam of size 230 × 500 MM overall is subjected to a factored shear force of 60 kN. Calculate, the nominal shear stress in concrete. Take effective cover as 50 mm.

4 Find the depth of neutral axis of singly reinforced rectangular 'beam 230 × 400 mm effective depth, reinforced, with 4 bars of 12 mm diameter. Grade of concrete is M20 and grade of steel is Fe 415. Use limit state method.

5 What is the minimum percentage of steel to be provided in slabs as per IS - 456 - 2000 ?

6 Explain the provision of reinforcement in two way slabs with corners held down as per IS 456-2000.

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 = 120mm

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 Shear force equations at inner and outer side of support next to end support.

10 What are the specifications for lateral ties in a column as per IS 456 - 2000.

PART - B 10×5=50

Instructions : *(1) Answer any **FIVE** questions.*
*(2) Each question carries **TEN** marks.*
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11 Design a RCC beam 300 mm wide to resist a bending moment of 65 kN/m. Use working, stress method. Grade of concrete is M25 and grade of steel is Fe 415.

12 Design a simply supported singly reinforced rectangular RC beam for flexure over a clear span of 4m. The superimposed load is 20 kN/m and width of supports is 300mm each. Use M20 grade concrete and Fe 415 steel. Check for deflection.

13 A doubly reinforced beam of width 300 mm and 600 mm effective depth is reinforced with 3 bars of 16 mm diameter bars in compression and 5 bars of 20 mm diameter bars in tension zones. Find the ultimate moment of resistance of the section. Effective cover is 40 mm for both the steels. Concrete grade is M 25 and steel is Fe 415.

14 Design a simply supported RCC slab for a room of clear dimensions 3.5 × 9 m. Width of supports is 0.3 m. Live load is 2 kN/sq. m and Weight of finishes is 1 kN/sq.m. Use M20 concrete and HYSD bars of grade Fe 415. Check for deflection.

15 A T beam of effective flange width 800mm, thickness of slab 90 mm, width of rib 230mm, and effective depth 400mm. is reinforced with 5 numbers of 20mm. diameter bars. Calculate the moment of resistance of the section. M20 grade concrete are Fe415 bars are used.

16 A continuous RCC rectangular beam of size 250 × 500mm overall is supported on 300 × 300 mm masonry columns at clear intervals 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 M20 grade and steel is Fe 415 grade. Design the reinforcement at support next to end support and interior support section. Assume effective cover of 40 mm.

17 Design a short Reinforced Concrete circular column with lateral ties to carry an axial load of 1000 kN. Use M20 concrete and Fe 415 steel.

18 A RC Column of size 400mm × 400mm carries a load of 1500 kN. The safe bearing capacity of soil is 200 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.