C16S-C-501

5816

BOARD DIPLOMA EXAMINATION, (C-16S)

NOVEMBER - 2019

DCE - V 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) Answer should be brief and straight to the point.
                   (4) IS 456-2000 may be allowed for reference.

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

2   What is limit state ? State limit state of collapse.

3   Calculate the effective depth of singly reinforced rectangular beam required to carry an ultimate moment of 125 kN–m. Assume the width of beam to be 230 mm, grade of concrete M20 and grade of steel Fe 415.

4   Name different types of sections of an R.C. rectangular beam w r t. neutral axis depth.

5   Distinguish between one way slab and two way slab.

6   What is the minimum reinforcement to be provided in slabs for mild steel and HYSD bars ?

7   Write the equations to calculate effective flange width of T-beams.

8   What are the conditions to be satisfied to adopt the moment and shear coefficients given in IS 456–2000 for continuous beams.

9   What are the advantages of continuous beams ?

10   Distinguish between long column and short column.

PART - B   10×5=50

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

11   A simply supported reinforced concrete beam of width 230 mm and effective depth 550mm is reinforced with 4-16mm diameter bars. Find the safe UDL the beam can carry including self weight if the effective span of beam is 5.8m. Use working stress method. Take grade of concrete as M20 and grade of steel as Fe 415.

12   A singly reinforced rectangular beam 300mm wide and 500mm effective depth is reinforced with 5-16 mm diameter bars of which 2 bars are bent up near the support. It carries a UDL of 42 kN/m including self weight over a simply supported span of 6m. Assume grade of concrete as M20 and grade of steel as Fe 415. Design the beam for shear reinforcement at support. http://www.sbtetonline.com

13   Design a rectangular reinforced concrete beam to resist an imposed load of 40kN/m acting over a clear span of 4.5m. The size of beam is restricted to 230 mm × 400 mm. The width of support is 300 mm and effective cover is 40mm. Use M20 grade concrete and Fe 415 grade steel.

14   Design a two way slab for a room of clear size 4.5m × 3.5m. The super imposed load is 2 kN/m^2 and floor finishes is 1 kN/m^2 The edges of slab are simply supported and corners are not held down. Use M20 grade concrete and Fe 415 grade steel Assume the slab is safe against shear and deflection Assume stiffness ratio as 28.

15 Calculate the moment of resistance of the T-beam with the following data
    width of flange is 750 mm, thickness of slab is 110 mm, width of rib 300mm, effective depth 600 mm, area of tension steel 2400 mm². Use M20 grade concrete and Fe 415 grade steel.

16 Design a singly reinforced concrete beam at the middle of interior span with the following data
    No of spans 3, clear distance between supports 3.5m, Imposed load (not fixed) 3 kN/m, imposed load (fixed) 6 kN/m, width of support 230mm Consider stiffness ratio as 15. Check the beam for deflection. Use M20 grade concrete and Fe 415 grade steel.

17 Design a rectangular short column to carry an axial load of 1100 kN. Assume width of column as 280 mm. Use M20 grade concrete and Fe 415 grade steel.

18 A reinforced concrete column of size 350 mm × 350mm carries an axial load of 900 kN. It is to be provided in the soil whose SBC is 220 kN/m² Design an isolated column footing with uniform thickness. Use M20 grade concrete and Fe 415 grade steel. Check for one way shear only