

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

## CIVIL ENGINEERING

## SIXTH SEMESTER

## CE 383 – DESIGN OF REINFORCED CONCRETE AND MASONRY STRUCTURES

{Regulations 2004}

Time: 3 hours

Max: 100 marks

Instructions:

Answer ALL questions

Necessary codes, tables and charts will be supplied

Missing data may suitably be assumed

## PART – A (10 x 2 = 20 marks)

1. What are the shortcomings in working stress method of design?
2. Prove that the depth of critical neutral axis is independent of grade of concrete.
3. How many 22 mm diameter tension bars can be adjusted in a beam of 300 mm width in one layer? Explain.
4. State the stipulations of IS 456:2000 regarding the control of deflection.
5. State the minimum amount of reinforcing bars to be used in slabs.
6. Distinguish between column and pedestal.
7. What are the critical sections for one way and two way shears in footing slabs?
8. What are the situations in which combined footings are preferred to isolated footings?
9. How the permissible stress on masonry is calculated?
10. What are the maximum slenderness ratio values for load bearing masonry walls?

## PART – B (5 x 16 = 80 marks)

11. An interior wall of a two storied building is 4.2m long. The height of each storey is 3m. The width of room on one side of the wall is 4m and the other side is 3.2m. The total load on each floor is 8 kN/m<sup>2</sup> (including self-weight of slab). Determine the thickness of wall required at the plinth level.
12. (a) A rectangular reinforced concrete beam of size 300 mm wide x 500 mm effective depth is reinforced with 4 numbers of 20 mm diameter bars on tension side. Find out the moment of resistance of beam and the uniformly distributed load the beam can carry over an effective span of 6 m with simply supported conditions. Also find the stresses induced in the concrete and steel. Adopt working stress method of design. The materials are M20 concrete and Fe 415 steel.

(Or)

(b) Design the main reinforcement of a singly reinforced rectangular beam of width 300mm and effective span 8 m carrying a total factored load of 40 kN/m over the entire span. Use M20 grade concrete and Fe 415 grade steel. Check the development length at the support if 50 percent of the reinforcing bars are continued to the support. Assume width of support as 300mm.

13. (a) A Tee beam has an effective flange width of 1500 mm, flange thickness of 100 mm, rib width of 300 mm and total depth of 550 mm. Design the reinforcement required for the beam if it is subjected to an ultimate bending moment of 650 kNm. Use M20 grade concrete and Fe415 grade steel.

(Or)

(b) Determine the reinforcement required for a R.C rectangular beam 300mm wide and 500mm effective depth subjected to a factored bending moment of 120 kNm, a factored torsion moment of 60 kNm and a factored shear force of 90 kN. Concrete of grade M20 concrete and HYSD steel of grade Fe415 are used.

- 14 (a) Design an interior panel of 4.5m x 6m (inner dimensions) of a reinforced concrete floor slab system of a building. Assume live load as 4 kPa and finish load as 1 kPa. Sketch the reinforcement details. Concrete of grade M20 concrete and HYSD steel of grade Fe415 are used. Adopt limit state method of design.

(Or)

(b) Design the reinforcement required for a short reinforced concrete column of size 400 mm x 600 mm subjected to a factored load of 1100 kN, a factored moments of 260 kNm about the major axis and 100 kNm about minor axis. Assume a clear cover of 50 mm. Concrete of grade M25 concrete and steel of grade Fe415 are used.

- 15 (a) Design and detail a reinforced concrete footing for a concrete wall of 200 mm thick to support a working load of 250 kN/m. Safe bearing capacity of the soil may be taken as 160 kPa. Concrete of grade M25 concrete and HYSD steel of grade Fe415 are used.

(Or)

(b) Design an isolated pad footing for a column of size 300 mm x 500 mm reinforced with 6 numbers of 25 mm diameter bars subjected to a factored load of 1500 kN. Safe bearing capacity of the soil is 175 kPa. Concrete of grade M25 concrete and HYSD steel of grade Fe415 are used.