

Reg. No

B.E. / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2011

CIVIL ENGINEERING
SIXTH SEMESTER

43

CE 9353 – DESIGN OF REINFORCED CONCRETE AND MASONRY STRUCTURES

(REGULATIONS 2008)

Time: 3 Hrs

Max Marks: 100

- Instructions:** 1. Answer all Questions
2. IS 456 & IS 1905 are permitted

PART A — (10 × 2 = 20 marks)

1. Differentiate under reinforced, over reinforced and balanced sections.
2. Why is it undesirable to design over-reinforced sections?
3. Describe the functions of longitudinal reinforcements in reinforced concrete columns.
4. Why is the partial safety factor for concrete greater than that for steel?
5. Distinguish between one way slab and two way slab.
6. Differentiate pedestal and short column?
7. Distinguish between a tied column and a spirally reinforced column.
8. Identical bars are placed at the top and bottom of a beam. Can there be a difference in the bond resistance? If so, why?
9. Differentiate isolated footing and Strip footing.
10. What are the factors affecting the load bearing capacity of load bearing walls?

PART B — (5 × 16 = 80 marks)

11. Design a simply supported beam of clear span 5m subjected to a superimposed load of 40kN/m at service stage. The beam resting on a support of width 250 mm. Use M20 concrete and Fe 415 steel.
12.
 - a. A rectangular beam section of 300mm width and 500mm effective depth is reinforced with 6- 16mm ϕ tension bars and 3- 16mm ϕ compression bars. Determine the stresses induced in the top compression fibre of concrete, compression steel and tension steel when it is subjected to a moment of 60 kNm. Consider M20 concrete and Fe 415 steel.

OR

- b. Design the steel for a rectangular reinforced concrete beam section of 250mm wide and 500mm effective depth subjected to a bending moment of 230 kNm. Adopt elastic method.

13.

- a. A reinforced concrete column of unsupported length 3 m is to be designed for a factored axial load of 2000 KN and uniaxial moment of 600 kNm. Determine the cross sectional dimension of the column and the reinforcement required.

OR

- b. Design a reinforced concrete spiral column of 300 mm diameter subjected to an axial factored load of 1500 KN. The column is braced against side sway and has unsupported length of 3 m.

14.

- a. Design an isolated footing to carry a column having axial loads of 1000kN. The allowable soil pressure is 165 kN/m^2 . Determine the size of the footing.

OR

- b. Design an isolated footing for circular column 400mm diameter to carry a service load of 4000kN. The column reinforcements are 8 – 25mm bars. The bearing capacity of soil is 400 kN / m^2 at a depth of 2m below the ground level. Assume M30 concrete and Fe415 steel for the footing and M25 and Fe415 for the column.

15.

- a. Design the masonry wall of a 3 storied building at ground level for the following data. The storey height is 3.0m. The wall supports RC Slab of size 4m x 3.5m with 140mm thick. The LL on the roof slab is 0.70 kN/m^2 and the finish load is 2.20 kN/m^2 .

OR

- b. Determine the allowable axial load on a column 300 mm x 600 mm constructed in first class brickwork in 1:6 cement mortar using modular bricks 200mm x 100mm x 200mm. The height of the pier between the footing and the top slab is 5.1m. The strength of units may be assumed as 10MPa.