Roll. No.									

B.E/ B.Tech (Full Time) ARREAR EXAMINATION, NOV./DEC 2011

CIVIL ENGINEERING

SIXTH SEMESTER

CE 383 – DESIGN OF REINFORCED CONCRETE AND MASONRY STRUCTURES

{Regulation-2004}

Time: 3 hours Max: 100 marks

Answer ALL questions

Use of IS 456, IS 1905 and Design Charts and Tables is permitted

Missing data may suitably be assumed

PART – A (10 x 2 = 20 marks)

1. Why the limit state design method is considered superior to the working stress design method?
2. Prove that the depth of critical neutral axis is independent of grade of concrete.
3. Why does IS: 456 limit the design compressive strength in structural concrete to $0.67f_{ck}$ and not f_{ck}?
4. Specify the code requirements for ensuring adequate development length in the bars near the zero moment location.
5. Mark the edge and middle strip portions of a two way slab and list the IS: 456 recommendations for reinforcing these strips.
6. What is meant by slenderness ratio in compression members?
7. What are one way and two way shears in footings?
8. Why is a pedestal provided for a column?
9. How the permissible stress on masonry is calculated?
10. What are the limiting slenderness ratios for load bearing masonry walls?

PART – B (5 x 16 = 80 marks)

11. An interior wall of a two storied building is 4m long. The height of each storey is 3.2m. The span of slabs on one side of the wall is 4.6m and the other side is 3.2m. The total load on each slab is 9 kPa (including self weight of slab). Design the wall at base level of the building.
12. (a) A rectangular reinforced concrete beam of size 300mm wide x 500mm effective depth is reinforced with 4 numbers of 20mm 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 6m 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 8m carrying a total factored load of 40 kN/m using M20 concrete and Fe 415 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 1500mm, flange thickness of 100mm, rib width of 300mm and total depth of 550mm. design the reinforcement required for the beam if it is subjected to an ultimate bending moment of 650 kNm. Use M20 grade concrete and HYSD steel of grade Fe415.

(Or)

(b) Determine the reinforcement required for a R.C rectangular beam 300 mm wide and 500 mm effective depth subjected to a factored bending moment of 100 kNm, a factored torsion moment of 50 kNm and a factored shear force of 80 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 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) A reinforced concrete column section of size 300 mm x 450 mm is subjected to a biaxial eccentrically applied factored load of 1500 kN. The eccentricities of the load from the centroid of the section in the directions of the larger and smaller dimensions are 75 mm and 50 mm, respectively. Determine the reinforcement required at a nominal cover of 40 mm along the faces. The grade of concrete mix and steel are M25 and Fe415, respectively.

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 300 mm x 500 mm reinforced with 6 numbers of 25 mm diameter bars subjected to a factored load of 1600 KN and a factored uni-axial moment of 120KNm about the major axis at the column base. Safe bearing capacity of the soil is 150 kPa. Concrete of grade M25 concrete and HYSD steel of grade Fe415 are used.