Roll. No.									

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

CIVIL ENGINEERING

SIXTH SEMESTER

CE 9353 – DESIGN OF REINFORCED CEMENT CONCRETE AND MASONRY STRUCTURES {Regulation-2008}

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. What are the demerits of working stress method of design?
2. What is partial safety factor? Why is the partial safety factor for concrete greater than that for steel?
3. Under what circumstances are doubly reinforced beams used in practice?
4. Why is continuous T - beam at supports designed as rectangular beam?
5. State the allowable limits of deflections in reinforced concrete slabs and beams.
6. What is meant by a dog-legged staircase? Sketch a layout of such a staircase and indicate the spans for design.
7. Distinguish between unsupported length and effective length of a compression member.
8. Enumerate the code requirements for the transfer of load at column base.
9. List the factors influencing the load carrying capacity of a masonry wall.
10. How do you determine the slenderness ratio of a masonry wall?

PART – B (5 x 16 = 80 marks)

11. Find the axial load carrying capacity of a masonry pier of size 300mm x 500mm. The height of wall between top of footing and the beam at top is 5m. Bricks of size 200 mm x 100 mm x 100 mm with compressive strength of 7.5 MPa and cement mortar 1:5 are used for the construction.
12. (a) Briefly describe the following design procedures for design of reinforced concrete structures:
    - (i) Working stress design
    - (ii) Ultimate load design
    - (iii) Probabilistic design
    - (iv) Limit state design

(Or)

(b) A reinforced concrete simply supported beam of rectangular section carries a uniformly distributed load of 20 kN/m inclusive of self-weight over an effective span of 7 m. From architectural reasons the width of beam has been fixed at 300 mm. Determine the effective depth and the tension steel required for balanced section. The materials used are M20 concrete and HYSD steel of grade Fe415. Adopt working stress method of design.

13. (a) Design the flexural reinforcement required for a rectangular reinforced concrete section of 250 mm wide and 500 mm effective depth subjected to an ultimate moment of 300 kNm. Use M20 concrete and Fe415 steel.

(Or)

(b) A Tee beam has an effective flange width of 1500mm, flange thickness of 100mm, web width of 300mm and effective depth of 500mm. Design the reinforcement required for the beam if it is subjected to an ultimate bending moment of 690 kNm. Use M20 grade concrete and HYSD steel of grade Fe415.

14 (a) Design the floor slab of a hall of size 3.3 m x 8 m. The slab is simply resting on 230 mm brick wall on all four sides and subjected to a live load of 4.5 kPa and finish load of 1 kPa. Adopt limit state method of design and sketch the reinforcement details. Concrete of grade M20 and steel of grade Fe 415 are used.

(Or)

(b) Design a dog-legged stair case for an office building for the following details:

Space available for stair = 3.5 m x 6m.

The vertical distance between the floors = 3m.

Live load = 3500 N/m^2.

Use M20 concrete and Fe415 steel.

15.(a) 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.

(Or)

(b) Design a combined rectangular footing for two columns 450 mm x 450 mm and 600 mm x 600 mm carrying 800 kN and 1000 kN respectively. The columns are located at 4 m apart. The safe bearing capacity of the soil is 200 kPa. Use concrete of grade M20 and steel of grade Fe415.