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B.E (Full Time) END SEMESTER EXAMINATION, APRIL/MAY 2014

CIVIL ENGINEERING

SIXTH SEMESTER

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

Time: 3 hours Max: 100 marks

Instructions: 1. Answer ALL questions

2. Necessary codes, tables and charts will be supplied

3. 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. Define: Characteristic strength of materials.
3. What do you mean by development length?
4. What are the stipulations of IS 456:2000 for spacing of transverse reinforcement when a member is designed for torsion?
5. Draw a neat sketch showing the reinforcement details in a cantilever slab.
6. Reinforced concrete slabs are generally singly reinforced. Why not doubly reinforced?
7. Describe the functions of transverse reinforcement in a reinforced concrete column.
8. What are the factors influencing the thickness of an isolated column footing?
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. An interior wall of a two storied building is 4.2 m long. The height of each storey is 3.6 m. The width of room on one side of the wall is 4.8 m and the other side is 3.8 m. The total load on each floor is 8.5 kN/m^2(including self-weight of slab). Assume the slabs on both sides of the wall as one way. Design the wall at plinth level.

12. (a) A rectangular reinforced concrete beam of size 250 mm wide x 450 mm effective depth is reinforced with 5 nos. of 16 mm diameter bars on tension side. Find out the moment of resistance of the beam section and also the stresses induced in the materials by working stress method of design. The materials are M20 concrete and Fe 415 steel.

(Or)

(b) A simply supported reinforced concrete beam of rectangular section has to carry a uniformly distributed load of 20 kN/m over an effective span of 6 m. Design the reinforcement required at mid span using M20 grade concrete and Fe 415 grade steel, when the size of the section is restricted to 250 mm x 600 mm effective. Adopt working stress method of design.

13. (a) A Tee beam has an effective flange width of 1500 mm, flange thickness of 100 mm, web 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 660 kNm. Use M20 grade concrete and Fe415 grade steel.

(Or)

(b) A reinforced concrete beam of rectangular section of size 300 mm x 500 mm effective is reinforced with 4 bars of 20 mm diameter at tension face and 3 bars of 16mm diameter bars at compression face at an effective cover of 50 mm. Determine the ultimate moment of resistance of the section. Use steel of grade Fe 415 and concrete of grade M20.

14 (a) Design the floor slab of a hall of size 3 m x 7 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 a 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 and sketch the reinforcement details for the following details:

Space available for stair = 3 m x 5 m.

The vertical distance between the floors = 3 m.

Live load = 3500 N/m^2.

Use M20 concrete and Fe415 steel.

15. (a) Design a short reinforced concrete circular column (helically reinforced) to carry a factored axial load of 2000 kN. Assume a clear cover of 40 mm to the helical reinforcement. Concrete of grade M25 concrete and steel of grade Fe415 are used.

(Or)

(b) Design an isolated pad footing for a 300 mm square column reinforced with 8 numbers of 20 mm diameter bars subjected to a factored load of 2000 kN. Safe bearing capacity of the soil is 175 kPa. Concrete of grade M25 and steel of grade Fe415 are used.