Reg.No. | | | | | | | | | | |

B.E (Full Time) END SEMESTER EXAMINATION, APRIL/MAY 2013

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 advantages of limit state method of design?
2. Prove that the depth of critical neutral axis of a beam section is independent of grade of concrete.
3. Mention at least two situations in which a doubly reinforced beam becomes necessary.
4. What are the major factors that affect deflection in beams?
5. What are the limitations in using the bending moment and shear coefficients for analyzing a one - way continuous slab?
6. Mention the provisions of torsional reinforcing bars in restrained type of two way slabs.
7. Distinguish between column and pedestal.
8. What are the conditions in which transfer of forces at the interface of column and footing is achieved without any reinforcement?
9. What are the limiting slenderness ratios for load bearing masonry walls?
10. List the factors affecting permissible stress on masonry?

PART – B (5 x 16 = 80 marks)

11. An interior wall of a two storied building is 4.5 m long. The height of each storey is 3.3 m. The span of slabs on one side of the wall is 4.2 m and the other side is 3.2 m. 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 300 mm wide x 500 mm effective depth is reinforced with 4 numbers of 20mm 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 M25 concrete and Fe 415 steel.

(Or)

(Design the flexural reinforcement required for a rectangular reinforced concrete beam section of 250 mm wide and 600 mm effective depth subjected to a bending moment of 120 kNm. Adopt working stress method and consider concrete of grade M20 and steel of grade Fe415.

13. (a) A simply supported reinforced concrete rectangular beam has an effective span 8m carries a total factored load of 20 kN/m. Design the main reinforcement required for the beam when it is singly reinforced. Also check the development length at the support if 50 percent of the reinforcing bars are continued to the support. Assume width of beam and support as 300 mm. Use M20 concrete and Fe 415 steel.

(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 110 kNm , a factored torsion moment of 55 kNm and a factored shearing force of 90 KN. Use concrete of grade M20 and steel of grade Fe415.

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

(Or)

(b) Design a dog-legged stair case for an office building for the following details:
Space available for stair = 3.0 m x 6 m.
The vertical distance between the floors = 3 m.
Live load = 3500 N/m^2.
Use M20 concrete and Fe415 steel.

15. (a) Design the reinforcement required for a short reinforced concrete column of size 400 mm x 600 mm subjected to a factored axial load of 1500 kN, a factored moments of 250 kNm about the major axis and 120 kNm about minor axis. Assume a clear cover of 40 mm. Concrete of grade M25 concrete and 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 2000 KN. Safe bearing capacity of the soil is 150 kPa. Concrete of grade M25 concrete and HYSD steel of grade Fe415 are used.