FACULTY OF ENGINEERING
B.E. 3/4 (Civil) I Semester (Suppl.) Examination, June 2012
REINFORCED CEMENT CONCRETE

Time : 3 Hours]　　　　　　　　　　　　　　　　　　　　　　　[Max. Marks : 75

Note : *Answer **all** questions from Part **A**. Answer **any five** questions from Part **B**.*

PART – A　　　　　　　　　　　　　　　　　　　　(25 Marks)

1. What are Bogue's compounds in cement ?　　　　　　　　　　　　2

2. What is the influence of W/C ratio on strength and workability of concrete ?　　3

3. Define the terms
    a) Working Stress
    b) Limit State　　　　　　　　　　　　　　　　　　　　　　　2

4. Derive the design constants for the combination of M-30 concrete and Fe-500 steel using working stress method.　　　　　　　　　　　　　3

5. Which of the assumptions indicate that over reinforced sections are not permitted in Limit state method ?　　　　　　　　　　　　　　　　2

6. Sketch the flexural, shear and torsional cracks in a beam.　　　　　　3

7. Why a reinforcing bar experiences more bond in compression than in tension ?　2

8. Give a detailed classification of RC slabs.　　　　　　　　　　　3

9. Differentiate between a long column and a short column.　　　　　　2

10. What measures would you adopt, if a footing fails in two-way shear check ?　3

PART – B　　　　　　　　　　　　　　　　　　　　(50 Marks)

11. a) Discuss the various properties of concrete.　　　　　　　　　6
    b) Explain any two tests to determine the workability of concrete.　　4

12. Determine what working udl can be safely placed on a beam of 230 mm × 370 mm effective dimensions reinforced with 4 bars of 16 mm diameter on the tension side and 2 bars of 16 mm on the compression side, both at an effective cover 30 mm. The beam is simply supported over an effective span of 6m. Adopt M-25 concrete and Fe-415 steel and use working stress method. 10

13. Design an intermediate beam for a hall of 18 m × 7 m effective dimensions, in which beams of 230 mm width are spaced at 3 m c/c and are cast integral with the slab of 125 mm thickness, which is to act a residential floor. Adopt M-25 concrete and Fe-415 steel and use limit state method. 10

14. Design the reinforcement in a beam of 300 mm × 600 mm subjected to a factored bending moment of 150 kN-m, a factored twisting moment of 15 kN-m and a factored shear of 100 kN. Adopt M-25 concrete and Fe-415 steel and use limit state method. 10

15. Design a helically reinforced circular column to carry an axial factored load of 1800 kN. Adopt M-25 concrete and Fe-415 steel and use limit state method. 10

16. Design a sloped square footing for a column of 300 mm × 300 mm carrying an axial factored load of 1800 kN. Adopt M-25 concrete and Fe-415 steel. Take the safe bearing capacity of soil as 350 kN/m². Use limit state method. 10

17. Write short notes on the following :
    a) Yield line theory for RC slabs. 4
    b) Total deflection in a beam. 3
    c) Check for bond in a beam. 3