

FACULTY OF ENGINEERING**B.E. 4/4 (CE) II – Semester (Main) Examination, April / May 2013****Subject: Advanced Reinforced Concrete Design (Elective – II)****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part – A and any five questions from Part – B.****PART – A (25 Marks)**

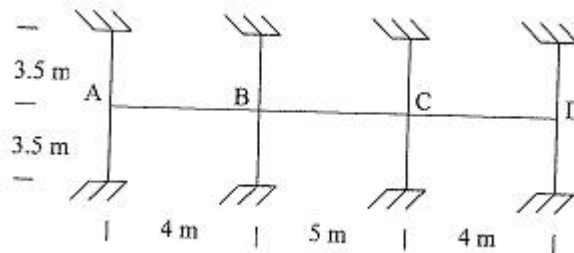
1. How does the design of a curved beam differ from the design of a straight beam? (2)
2. A circular beam supported on six equally spaced columns on a 10 m diameter curve carries an all inclusive u.d.l. of 20 kN/m. Draw the SFD and BMD. (3)
3. Sketch the reinforcement details at the junction of a beam and column at an intermediate floor. (2)
4. List the IS codal provisions for the design of deep beam. (3)
5. Give two examples where portal frames are provided in construction industry. (2)
6. Draw a substitute frame indicating the loading position for maximum positive negative BM at mid span of a beam. (3)
7. Differentiate between flat slab and ordinary slab with respect to placement of reinforcement. (2)
8. List the assumptions made in equivalent frame method for analysis of flat slabs. (3)
9. What is a raft foundation? When these foundations are provided? (2)
10. Sketch the reinforcement details in a typical raft foundation. (3)

PART – B (5x10 = 50 Marks)

11. Design and detail a circular curved beam for a water tank supported on four equally spaced columns on a 5 m diameter curve subjected to a u.d.l. of 14 kN/m. Use M25 grade concrete and Fe 550 grade steel. Use of SF, BM and TM coefficients table is permitted. (10)
12. Design and detail a simply supported deep beam using the following data:
 Span of beam = 5 m
 Overall depth = 4 m
 Width of support = 0.5 m
 Width of beam = 0.6 m
 u.d.l. (including self weight) = 300 kN/m
 Use M20 grade concrete and Fe 415 grade steel. (10)
13. A reinforced concrete portal frame, hinged at its bases, is of span 12 m and height 7 m. The frame carries an all inclusive u.d.l. of 20 kN/m. Design the columns for the frame. Use M25 grade concrete and Fe 500 grade steel. Sketch neatly the reinforcement details. (10)
14. A reinforced concrete portal frame, hinged at its bases, is of span 10 m and height 6 m. The frame carries an all inclusive u.d.l. of 26 kN/m. Design the slab and footing including the hinge at base for the frame. Use M25 grade concrete and Fe 415 grade steel. Sketch neatly the reinforcement details. (10)

-2-

15. The substitute frame at a typical floor level of a multi-storied building frame is shown below. Calculate the maximum support moment at B. Take DL = 15 kN/m and LL = 30 kN/m. Assume moment of inertia of all columns = $2I$, beams AB and CD = $2I$ and beam BC = $3I$. (10)



16. Design the interior panel of a flat slab for a column grid of 7 m x 7 m for a hotel building and to carry a live load of 5 kN/m^2 . Use M30 grade concrete and Fe 500 grade steel. Sketch neatly the reinforcement details. (10)
17. A building plan consists of four columns arranged in two rows and spaced 4 m c/c in both directions. The columns carry a service load of 1200 kN each. Design and detail a suitable raft foundation for the building. The S.B.C. of soil is 150 kN/m^3 . Use M35 grade concrete and Fe 550 grade steel. (10)
