Code No. 3179

FACULTY OF ENGINEERING

B.E. 4/4 (Civil) II-Semester **(Main)** Examination, May 2011

Subject : **Advanced Reinforced Concrete Design (Elective-II)**

Time : 3 Hours Max. Marks: 75

Note: Answer **all** questions of Part - A and answer any **five** questions from Part-B.

PART – A (25 Marks)

1. Mention the situations where beams curved in plan are needed. (2)
2. How the torsion is taken care in the design of curved beams? (3)
3. Differentiate between the design philosophies of a normal beam and a deep beam. (3)
4. When a beam is called deep beam? (2)
5. Give two examples where portal frames are provided in construction industry. (2)
6. Write the procedure for design of an R.C. hinge. (3)
7. Sketch the reinforcement details at the junction of a beam and column at an intermediate floor. (3)
8. Draw a substitute frame indicating the loading position for maximum positive and negative BM at mid span of a beam. (3)
9. Explain briefly about openings in flat slabs. (2)
10. Enumerate the situations under which a raft foundation is preferred. (2)

PART – B (50 Marks)

11. Design a semi-circular curved beam, in plan, supported on three equally spaced columns on a 14 m diameter curve for an all inclusive exposed u.d.l. of 16 kN/m. Use M25 grade concrete and Fe 415 grade steel. Sketch the reinforcement details. (10)
12. Design a simply supported deep beam to carry an exposed load (including self weight) of 350 kN/m. Take clear span as 5 m; overall depth as 3.5 m; and width of supports as 600 mm. Use M20 grade concrete and Fe 415 grade steel. Draw the reinforcement details. (10)
13. A hinge based reinforced concrete portal frame is of 9 m span and 3.3 m height and carries an exposed load of 30 kN/m. Design the floor beams for the frame and sketch the reinforcement details. Use M25 grade concrete and Fe 500 grade steel. (10)
14. An R.C. portal frame, hinged at its bases, is of span 8 m and height 5 m. The frame carries an all inclusive u.d.l. of 35 kN/m. Design the slab and footing for the frame. Sketch the reinforcement details. Use M30 grade concrete and Fe 500 grade steel.(10)
15. The substitute frame at a typical floor level of a multi-stroreyed building frame is shown in Fig. 1. Calculate the maximum mid-span moment between B and C. Take DL as 15 kN/m and LL as 30 kN/m. Assume the moment of inertia of all columns as $3I$; beams AB and CD as $2I$; and beam BC as $3I$. (10)

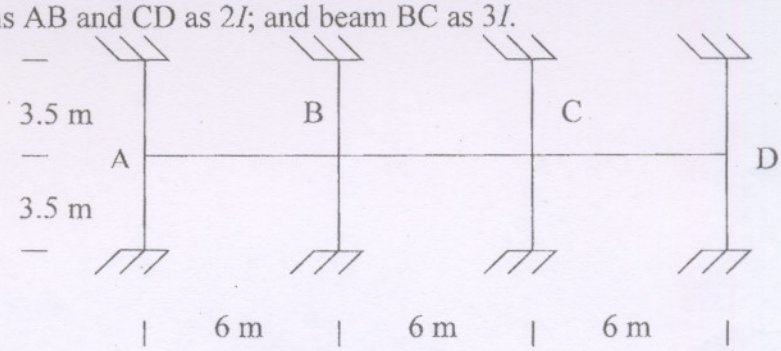

Fig. 1

16. Design a flat slab for the interior panel of an assembly hall of 21 m x 21 m. The slab is resting over 16 columns of each 600 mm x 600 mm spaced at equal intervals. Draw the reinforcement details. Use M30 grade concrete and Fe 500 grade steel. (10)
17. A building plan consists of six columns arranged in two rows and spaced 5 m c/c in both directions. The corner columns carry 1000 kN, while the others carry 1500 kN. Design a raft foundation for the building if the S.B.C. of soil is 100 kN/m^2. Sketch the reinforcement details. Use M25 grade concrete and Fe 415 grade steel. (10)

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