B.Tech Sixth Semester Examination (2013 Scheme)

13.602 DESIGN OF REINFORCED CONCRETE STRUCTURES (C)

MODEL QUESTION PAPER

Time: 3 Hrs. Max. Marks: 100

Instructions:

Use of IS 456, IS 1343 and Interaction curves for columns are permitted in examination halls.

Part A

(Answer all questions. Each question carries 4 marks)

1. Explain different design philosophies briefly.
2. Differentiate between one-way and two-way slab.
3. Discuss briefly limit state of serviceability.
4. Explain the behaviour of long columns.
5. Explain post tensioning with the aid of a neat sketch.

Part B

(Answer one question from each module. Each question carries 20 marks)

Module I

6. A reinforced concrete beam of breadth 250 mm and effective depth 500 mm is reinforced with 4 No.s 20 mm bars in the tension zone and 3 No.s 16 mm bars in compression zone. The effective cover to compression reinforcement is 30 mm. Determine the moment of resistance of the section if M_{20} concrete and Fe_{415} grade steel are used.

OR

7. A reinforced concrete beam simply supported over a clear span of 6 m is supported on brick walls of 500 mm width on both ends and carries a uniformly distributed live load of 4.5 kN/m. Design the beam using M_{25}

concrete and Fe_{415} grade steel.

Module II

8. Design a floor slab of size 4.5 m X 5.2 m simply supported on all the four edges by brick walls of width 230mm, subjected to a live load of 2.5 kN/m^2. M_{20} concrete and Fe_{415} grade steel are used.

OR

9. Design a rectangular reinforced concrete beam section to resist a factored bending moment of 200 kNm, a torsional moment of 70 kNm and a factored shear force of 100 kN using M_{20} concrete and Fe_{415} grade steel.

Module III

10. Design a short column to resist an axial force of 1200 kN and a bending moment of 150 kNm using M_{30} concrete and Fe_{415} grade steel.

OR

11. Design an isolated footing for a square column of size 400 mm X 400 mm subjected to an axial load of 1000 kN using M_{20} concrete and Fe_{415} grade steel. The safe bearing capacity of soil is 180 kN/m^2 and unit weight of soil is 18 kN/m^3.

Module IV

12. Explain different losses in prestressing.

OR

13. Find the moment of resistance of a post-tensioned bonded beam of size 300 mm X 500mm prestressed with wires of area 800 mm^2 at an effective depth 400 mm. M_{50} grade concrete and prestressing steel with f_p= 1500 N/mm^2 are used.