

R09

Code: 9A01501

III B. Tech I Semester (R09) Supplementary Examinations, May 2012
DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours

Max Marks: 70

Use of IS 456-2000, IS-800 code books to be permitted in the examination hall.

Part A

(Answer any one question, 1 x 28 marks)

- 1 Design an RC rectangular section to resist an applied moment of 400 kN.m, if the allowable stresses in concrete and steel are 5 N/mm² and 140 N/mm² respectively. (Assume $d/b = 2$.)
- 2 (a) Draw the stress-strain curve for M 20 concrete and Fe 415 steel:
(a) As obtained in the laboratory.
(b) As assumed in IS 456. How do you determine yield point of steel in the laboratory?
(b) What is meant by durability? Name the factors that affect durability of reinforced concrete structures.

Part B

(Answer any three questions, 3 x 14 marks)

- 3 A reinforcement concrete cross section of 200 mm width and 400 mm effective depth is provided with 4 numbers of 20 mm bars in tension zone and 3 numbers of 20 mm bars in the compression zone at depth 50 mm from the compression fiber. Determine whether the cross-section is capable of resisting limit moment.
- 4 The critical section of an RC rectangular beam is subjected to a bending moment of 25 kNm, a Torsional moment of 10 kNm and a shear force of 30 kN. The overall size of the section is 300 mm x 600 mm. provide effective cover to reinforcement as 40 mm. concrete grade M 25 and steel grade Fe 415 are used. Design the necessary reinforcements for the section. Draw the drawings showing the design details
- 5 (a) A short column, 600 mm x 600 mm in section, is subjected to a factored axial load of 1500 kN. Determine the minimum area of longitudinal steel to be provided, assuming M 20 concrete and Fe 415 steel
(b) Design the reinforcement in a column of size 400 mm x 600 mm, subjected to a factored axial load of 2500 kN. The column has unsupported lengths of 3.0 m and is braced against side way in both directions. Use M 20 concrete and Fe 415 steel.
- 6 Design a square footing for a square column 500 mm x 500 mm, reinforced with 6-25 Φ bars, and carrying a service load of 1350 kN. Assume soil with an allowable pressure of 230 kN/m² at a depth of 1.85 m below ground. Assume Fe 415 grade steel and M25 for both column and footing. Sketch the details showing the design
- 7 It is required to cover in 2.5 m wide verandah in the entrance of a residential building with a reinforced concrete roof slab. Make usual assumptions for loads and stresses and design the roof slab. Sketch the designed section and draw the bar bending schedule.
