

Code: 9A01501

B.Tech III Year I Semester (R09) Supplementary Examinations December 2015

DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Use of IS 456:2000, SP16 Design aided charts only and IS:875 (Part 1 & Part 2) books are permitted in the examination hall.

PART – A

(Answer any one question, 1 X 28 marks)

- 1 Design a RC floor for slab a room 4.5 m x 7 m in size to support a super imposed load of 5 kN/m^2 . The edges of the slab are freely supported and its corners are held down. Draw plan and sectional elevations in detail.
- 2 Design a square footing for a square column 450 mm x 450 mm, reinforced with 6-25 Φ bars, and carrying a service load of 1250 kN. Assume soil with an allowable pressure of 230 kN/m^2 at a depth of 1.5 m below ground. Assume Fe415 grade steel and M25 for both column and footing. Draw plan and sectional elevations in detail.

PART – B

(Answer any three question, 3 X 14 marks)

- 3 (a) Define different types of loads acting on structural members
(b) The overall size of RC beam is 250 mm x 480 mm. If M20 grade concrete and Fe415 grade steel are used, find out the area of tensile steel required for a balanced section. Effective cover for the tensile reinforcement is 35 mm. Use working stress method or elastic theory method.
- 4 Determine the limit moment capacity of reinforced concrete T-section for the following details: $b_f = 1200 \text{ mm}$, $t = 150 \text{ mm}$, $b_w = 400 \text{ mm}$, $d = 600 \text{ mm}$, $A_{st} = 4900 \text{ mm}^2$, $f_{ck} = 20 \text{ N/mm}^2$, $f_y = 415 \text{ N/mm}^2$.
- 5 (a) Write a short note on design of rectangular sections for torsion bringing out the various provisions made in IS: 456 in this respect.
(b) A simply supported RC beam of 360 mm x 720 mm overall size and M25 grade concrete carrying an all inclusive u.d.l of 40 kN/m over 8 m span. It is reinforced with 6 bars of 18 mm dia. Fe415 grade steel at its mid span in the tension zone with a clear cover of 35 mm and 3 numbers of 20 mm dia. Bars in the compression zone. Two of the tension bars are bent-up at 60° and taken to the top near the supports. Determine the spacing of 8 mm stirrups required near the supports when bar is cranked.
- 6 Design a slender un braced rectangular column with the following data:

Column size	=	35 cm x 45 cm
Steel grade	=	Fe 500
Effective length l_x	=	4 m
Effective length l_y	=	3.5 m
Unsupported Length	=	6 m
Factored axial load	=	400 kN

Factored moment in the direction of larger dimension = 50 kNm.
Factored moment in the direction of shorter dimension = 20 kNm.
- 7 (a) Explain about short and long term deflections.
(b) A simply supported L beam 6 m span has effective flange width of 90 cm thickness of flange as 15 cm, breadth of web as 30 cm and effective depth as 45 cm. There are 4 bars of 22 mm in tension and 3 bars of 18 mm in compression, check the beam for deflection, shear and moment. Assume M25 concrete and Fe 415 grade HYSD bars.
