

**R09****Code: 9A01501**

B.Tech III Year I Semester (R09) Supplementary Examinations June 2017

**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 &amp; Part 2) books is permitted in the examination hall.

**PART – A**

(Answer any one question, 1 X 28 marks)

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- 1 Design a slender circular column of 30 mm diameter with the following data:  
Unsupported length = 5 m  
Effective length = 5 m  
Axial load = 500 kN  
Moment at top = 60 kNm  
Moment at bottom = 40 kNm  
The column bends in double curvature.  
Draw the plan and section elevation showing reinforcement details.
- 2 Design and detail a reinforced concrete square isolated footing for a column of size 600 x 400 mm carrying a axial service load of 2500 kN inclusive of its own weight. The safe bearing capacity at the level of the footing base as 200 kN/m<sup>2</sup>. Use M25 and Fe415. Draw the plan and elevation of the footing showing reinforcement details.

**PART – B**

(Answer any three question, 3 X 14 marks)

- 3 (a) Justify the assumptions that concrete resists no flexural tensile stress in reinforced concrete beams.  
(b) Describe the moment-curvature relationship for reinforced concrete beams. What are the possible modes of failure?
- 4 A reinforcement concrete cross-section of width 400 mm and effective depth 800 mm is provided with 4 numbers of 20 mm bars as tension reinforcement. The beam is simply supported with an effective span of 8 m and subjected to live UDL of 24 kN/m. Find moment of resistance of M20 and Fe415 bars.
- 5 A simply supported reinforced concrete beam of cross-section 350 x 750 mm overall has to carry a uniformly distributed factored load of 137.50 kN/m over a clear span of 8 m. The beam is reinforced with 4 bars of 25 mm dia in tension at an effective cover of 50 mm throughout the beam. Design the shear reinforcement, if the grades of concrete mix and steel are M20 and Fe 415 respectively.
- 6 Design a two way slab for the floor of a room of clear dimensions 4 m x 5 m to carry an imposed load of 3.0 kN/m<sup>2</sup>. The edges of the slab are discontinuous and the corners are prevented from lifting. Width of supports around is 200 mm. Take M20 and Fe415.
- 7 A simply supported rectangular beam of 12 m span is of breadth 300 mm and effective depth 750 mm, tension steel required is 3000 mm<sup>2</sup> and that provided is 3200 mm<sup>2</sup>, 2 Nos. of 16 mm bars are provided as compression steel. Check the beam for deflection consideration according to IS 456 assuming grade 20 concrete and Fe 415 steel.

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