

B.Tech III Year I Semester (R13) Regular 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: 01 X 28 = 28 Marks)

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- 1 Design and draw reinforcement detailing of an L- beam for an office floor to suit the following data:  
Clear span = 8 m  
Thickness of flange = 150 mm  
Live load = 4 kN/m<sup>2</sup>  
Spacing of beams = 3 m  
Adopt M-20 grad concrete and Fe – 415 HYSD bars
- 2 Design and draw a reinforcement details of a combined footing for two reinforced concrete columns using the following data:  
Size of column = 300 mm by 300 mm  
Spacing of column = 4 m  
Load transmitted by each column = 500 kN  
SBC of soil = 150 MPa and adopt M20 grade concrete and Fe – 415 grade steel.

**PART – B**

(Answer three questions: 03 X 14 = 42 Marks)

- 3 Design a reinforced concrete beam of rectangular section using the following data:  
Effective span = 5 m  
Width of the beam = 250 mm  
Overall depth = 500 mm  
Service load (DL+LL) = 40 kN/m and effective cover = 50 mm.  
Adopt M-20 grad concrete and Fe – 415 HYSD bars.
- 4 Design a rectangular slab 5 m by 4 m in size and simply supported at the edges to support a service load of 4 kN/m<sup>2</sup>. Assume coefficient of orthotropy ( $\mu$ ) as 0.7. Adopt M-20 grade concrete and Fe-415 HYSD bars.
- 5 Design the reinforcements in a circular column of diameter 300 mm to support a service axial load of 800 kN. The column has unsupported length of 3 m and is braced against side sway. The column is reinforced with helical ties. Adopt M-20 grade concrete and Fe-415 HYSD steel.
- 6 Design a reinforced concrete footing for a rectangular column of section 300 mm by 500 mm supporting an axial factored load of 1500 kN. The safe bearing capacity of the soil is 185 kN/mm<sup>2</sup>. Adopt M-20 grade concrete and Fe-415 steel HYSD bars.
- 7 Design one of the flights of dog-legged stairs spanning between landing beams using the following data: Number of steps in the flight = 10, Tread (T) = 300 mm, rise (R) = 150 mm  
Width of landing beams = 300 mm, M-20 grade concrete and Fe-415 HYSD bars.

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