Code No: R1631014 **R16** SET - 1

III B. Tech I Semester Supplementary Examinations, October/November- 2020

DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES

(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any ONE Question from Part – A and any THREE Questions from Part – B

IS: 456 – 2000 & Column interaction diagrams only from SP – 16 are to be provided to the student in the Examination hall.

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PART –A (28 Marks)

1 Design and draw reinforcement details of a combined footing for two reinforced concrete columns using the following data: [28M]
Size of column = 300 mm X 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.

(OR)

2 Design an R.C.C. slab of size 5 m x 6 m, simply supported on all four edges with corners held down. The slab is carrying a load of 4 kN/m^2 including floor finish etc. Use M 20 concrete and Fe 415 steel. Sketch the details of reinforcement also. [28M]

PART –B (42 Marks)

3 Determine the moment of resistance of the beam section. Data given B= 250 mm, D=400 mm, A_{sc}=3 bars of 22 mm dia, A_{st}=3 bars of 28 mm dia, clear cover=30 mm. Use M20 concrete and Fe 415 Steel. Use the working stress method. [14M]

4 Determine the Moment of Resistance of T –beam as given in data: [14M]
Width of Flange =1200 mm, width of Web=300 mm, Depth of flange=100 mm, Effective depth of the section=560 mm, A_{st}=6 bars of 28 mm. Use M20 and Fe415 grades.

5 A simply supported beam, 300 mm wide and 600 mm effective depth carries a uniformly distributed load of 74 kN/m including its weight over an effective span of 6 m. The reinforcement consists of 5 bars of 25 mm in diameter. Out of these, two bars can be safely bent up at 1 m distance from the support. Assume Steel grade Fe415, Concrete M25. Design the shear reinforcement for the beam. [14M]

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^2. Adopt M-20 grade concrete and Fe-415 steel HYSD bars. [14M]

7 A reinforced concrete rectangular column of size 240 mm x 300 mm with an effective height of 3.2 m is reinforced with 4 bars of 20 mm diameter provided one at each corner with an effective cover of 60 mm. Check the safety of the column if it is subjected to Pu=350 kN, Mux=32 kN-m and Muy=20 kN. Assume M20 concrete and Fe 415 grade steel reinforcement. [14M]

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