III B. Tech I Semester Supplementary Examinations, May-2019
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
Use of IS: 456-2000 and design charts from SP-16 is allowed.
For all designs adopt Limit State Method
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PART –A

1   Deign a reinforced concrete beam of size 300 mm x 450 mm simply supported over effective span of 4.5m carrying moment 40kN-m and shear 25kN. The beam is supported by 300 mm thick walls. Use M25 grade concrete and Fe415 steel; design the beam section for shear, bending and serviceability conditions include curtailment of reinforcement and anchorage requirements. Neatly sketch the detailing of reinforcement.   [28M]

2   Design a R.C circular column and circular footing of column subjected to axial load 300 kN and moment 12 kN-m. Assume safe bearing capacity of soil at a depth 1.5 m below ground is 250 kN/m^2. Assume size of column size restricted to 300 mm diameter, and its effective length 4m. Check the design for both column and footing for shear, bending and anchorage requirements.
Neatly sketch the reinforcement details for column and footing. Use M25grade concrete and HYSD steel Fe415.   [28M]

PART -B

3   Find the steel reinforcement required to resist bending moment 28kN-m and shear 16kN of rectangular simply supported R.C beam 250x400mm. Give the curtailment of reinforcement, shear and anchorage requirements of bars. Use M25 grade concrete and Fe415 steel HYSD. (Use working stress method). Assume the following data:
Steel young's modulus Es=2.0x10^5 MPa, modular ratio m=8, clear cover=40 mm.   [14M]

4   A rectangular R.C beam of size 300 mm x 450 mm is reinforced with tensile steel 3no 16 mm diameter bars and compressive steel 3nos 12 mm diameter bars. Find out the allowable bending stress in concrete and steel if the beam subjected to maximum bending moment of 60 kN-m .Use effective cover to reinforcement 50 mm. Suggest the grade of concrete and steel used for beam design.   [14M]

5   A rectangular cantilever beam 250 mm x 300 mm projected over a span of 2.4 m subjected to impose load 6kN/m. Design the beam for bending, shear reinforcement and anchorage requirements. Use M20 grade concrete and Fe415 steel. Neatly sketch the reinforcement detailing.   [14M]

6   Design a R.C slab of effective size 3mx8m simply supported on four edges and   [14M]
     carrying live load 6kN/m^2. Assume the corners are restrained at ends. Design the
     slab for shear, bending and torsion (use I.S code method). Use M20 grade concrete
     Fe415 steel.

7   Design a R.C rectangular footing forcolumn carrying axial load 60 kN. Assume the   [14M]
     size of column 300 mm x 300 mm and allowable bearing pressure of soil 240 kN/m^2
     at a depth 1.20 m below ground. Design the footing for shear, bending and
     anchorage. Use M20 grade concrete Fe415 steel.

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