Code No: NR 310103

NR

III B.Tech. I Semester Supplementary Examinations, November 2005

STRUCTURAL ENGINEERING-I(RCC) DESIGN AND DRAWING
(Civil Engineering)

Time: 3hours **Max.Marks80**

PART-A

Answer any ONE question from PART-A [32Marks]

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1. Design the panel of slab is 4.5m x 6m. One short edge and long edge of the slab are discontinuous and other short edge and long edges are continuous. Superimposed load is 3 KN/m^2 and floor finishes being 1.5 kN/m^2. Use M20 concrete and Fe 415 steel. Adopt limit state method. Assume mild exposure condition. Draw the cross section of the slab with the reinforcement details. [24+8]

2. A hall of building is to be provided with a floor consisting of a continuous slab cast monolithically with simply supported beams spaced 3.5m apart. The span of beam is 8m. Live and partition load are 3 kN/m^2 and 1.5kN/m^2 respectively. The finishes are 0.5kN/ m^2. Design the slab using M20 grade concrete and Fe 415 grade steel. Use limit state method. Draw to scale.
   a) Longitudinal section of the slab showing the reinforcement details.
   b) The cross section at mid span showing the reinforcement details. [24+8]

PART-B

Answer any THREE questions from PART-B (3 x 16 = 48 Marks)

3. Design a simply supported concrete beam to support a uniformly distributed factored load of intensity 40kN/m inclusive of its own weight on an effective span of 4m. Verify the capacity of the section to take care of shear in beam. Use M20 grade concrete and Fe 415 steel. [16]

Contd..2

4.a) Find the ultimate moment of resistance of a T-section. The materials are M20 grade concrete and HYSD reinforcement of grade 415. Breadth of flange is 1350 mm depth of slab is 100mm and breadth of rib is 300mm. Tension reinforcement consist of 5 bars of 20mm diameter bars. Assume moderate exposure condition.

b) Explain the terms
i) Bond and anchorage ii) Development length.

[10+6 =16]

5.a) What is effective length of a column? How the behavior is affected by effective length.

b) A column of unsupported length 4.5m is subjected to an axial load of 900kN Assume both ends as hinged. Design a rectangular column if one of the dimensions is restricted to 230mm. Use M20 concrete and Fe 415 grade steel. Assume moderate exposure condition. [4+12 = 16]

6. A simply supported rectangular beam of effective span 10m is having breadth 300mm and effective depth of 600mm. Tension steel provided is 2200mm^2 and two numbers 16mm bars are provided as compression reinforcement. Estimate the short term deflection and deflection due to shrinkage. Assume moderate exposure condition. Use M25 concrete and Fe 415 steel. [16]

7.a) Explain importance of safe bearing capacity of soil. [4+2=16]

b) Design an isolated sloped rectangular footing for a column 450mm X 300mm carrying a service load of 1200 kN using M20 concrete and Fe415 steel.

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