Code :R7310102

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III B.Tech I Semester(R07) Supplementary Examinations, May 2011
DESIGN OF REINFORCED CONCRETE STRUCTURES
(Civil Engineering)

Time: 3 hours

Max Marks: 80

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PART-A
(Answer any ONE questions 1 X 32 = 32 Marks)

1. A T-beam floor has 125mm thick slab forming part of T-beams which are of 8m clear span. The end bearing are 450mm thick. Spacing of T-beams is 3.5m. The live load on the floor is 3 kN/m^2. Design one of the intermediate beams for both flexure and shear. Use M20 concrete and Fe 415 grade steel. Draw to a suitable scale.

   (a) Longtudinal section showing the reinforcement details.
   (b) Cross section of the beam at mid span and supports showing reinforcement details.

2. Design a continuous R.C slab for a class room of 7m wide and 14m long. The roof is to be supported on R.C.C beams spaced at 3.5m intervals. The width of the beam should be kept 230mm. The superimposed load is 3 kN/m^2 and finishing load expected is 1 kN/m^2. Use M20 concrete and Fe 415 steel.

   (a) Draw the reinfocement of the slab in plan view.
   (b) Draw cross section of the slab with reinforcement details.

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

3. A rectangular beam is 200mm wide and 400mm deep up to the centre of the reinforcement. Find the reinforcement required if it has to resist a moment of 40kNm. Assume M20 mix and Fe 415 grade steel.

4. A column of size 250mm x 500mm supports a cantilevel beam of span 2.5m. The cross section of the beam is 230mm x 500mm and is reinforced with 4 bars of 20mm Fe 415 steel. Concrete used is of grade M20. Assuming effective cover is 50mm, calculate the anchorage length required and sketch how it is provided.

5. Design a short column under biaxial bending with the following data: Size of the column =400mm x 400mm, Grade of concrete =M20, Grade of steel =Fe 415, Factored load =1000kN, Factrored moment M_{ux}=70KNm, M_{uy}=60KNm.

6. A rectangular column 400mm x 600mm transfers a dead load of 880 kN and a live load of 2000 kN without any moment and there is no over burden. The safe bearing capacity of the soil is 150 kN/m^2, M20 grade of concrete and HYSD steel bars of Fe 415 grade shall be used. Design the rectangular footing to support the column.

7. (a) Explain span/depth ratio for limiting deflection of beams.
   (b) A beam of 230mm x 500mm size with M20 grade concrete and 3% HYSD reinforcement, span 6.5m carries an UDL of 20 kN/m. Compute the control deflection as per I.S code.

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