Code No: RR310103 **Set No. 1**

III B.Tech I Semester Regular Examinations, November 2006
STRUCTURAL ENGINEERING DESIGN AND DRAWING-I(RCC)
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any ONE Question from PART-A
and any THREE Questions from PART-B
Note:Assume suitable data whenever necessary
Use of IS codes & Structural Tables is permitted

⋆ ⋆ ⋆ ⋆ ⋆

PART-A(Marks:32)

1. Design the Flexural Reinforcement for the Rectangular concrete Beam of size 250 mm ×400mm simply supported an two marmarry walls 230mm thick and 6m apart. The Beam has to carry in addition to its own weight, a distributed live load of 10kN/m, dead load of 5 kN/m and a concentrated dead load of 30kN placed at the mid span point. Assume that the Beam in subjected to moderate exposure conditions and grade of steel Fe 415 used.
   Draw suitable scale longitudinal section and cross section of the Beam

2. Design an Isolated footing for a column 300mm x 500 mm reinforced with 6-25mm dia bars with Fe 415 steel and M25 concrete subjected to a factored axial load of 1000 kN and a factored uniaxial moment of 120 kNM (with respect to the major axis) at the column base. Assume that the moment is reversible. The safe bearing capacity may be taken as $200kN/mm^2$ at a depth of 1.25m. Assume M20 concrete and Fe 415 steel for the footing.

   Draw to scale

   (a) Plan of the footing

   (b) Sectional elevation showing reinforcement detials.

PART-B (Marks:16x3=48)

3. (a) Why water is essential for concrete making?

   (b) Discuss the requirements for mixing water for concrete. Why sea water is not normally recommended?

4. (a) Define the term 'partial safety factors' as used in limit state design. Identify the various factors and state the values recommended in IS 456.

   (b) Compare 'working stress method' and 'limit state' design of R.C.C. structures. Explain the answer with suitable examples.

5. Design the reinforcement of a beam 450 mm wide 650mm deep subjected to a bending moment of 120 kN-m' twisting moment of 15 kN-m and a shear force of 120 kN- at ultimate. Use M20 grade concrete and Fe 145 steel.

6. (a) What is the minimum percentage of steel allowed in a R C column? Explain why it is necessary to specify the minimum percentage

   (b) A R.C. column rectangular in section 230mm wide and 300mm deep is reinforced with 4 bars of 20mm one at each corner with an effective cover of 50mm. It is subjected to an ultimate axial load of 340 KN, ultimate bending Moment of Mu_x=30KN-M about X axis is bisecting the depth and ultimate moment of Mu_y=18KN-M about Y axis bisecting the width. Use M20 grade concrete and Fe 415 grade steel. Check the safety of the column.

7. Explain the I.S code provisions for limit state design for serviceability for deflection of slabs. By assuming suitable data illustrate the same with a numerical example.

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR310103 **Set No. 2**

III B.Tech I Semester Regular Examinations, November 2006
STRUCTURAL ENGINEERING DESIGN AND DRAWING-I(RCC)
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any ONE Question from PART-A
and any THREE Questions from PART-B
Note:Assume suitable data whenever necessary
Use of IS codes & Structural Tables is permitted

⋆ ⋆ ⋆ ⋆ ⋆

PART-A(Marks:32)

1. Design the Flexural Reinforcement for the Rectangular concrete Beam of size 250 mm ×400mm simply supported an two marmarry walls 230mm thick and 6m apart. The Beam has to carry in addition to its own weight, a distributed live load of 10kN/m, dead load of 5 kN/m and a concentrated dead load of 30kN placed at the mid span point. Assume that the Beam in subjected to moderate exposure conditions and grade of steel Fe 415 used.
   Draw suitable scale longitudinal section and cross section of the Beam

2. Design a plain concrete footing for a column 300mm × 30mm carrying an axial load of 330 kN. Assume an allowable soil bearing pressure of 360 kN/m^2 at a depth of 1.0m below ground. AssumeM_{20} concrete and Fe 415 steel.
   Draw to scale showing
   (a) Plan of the footing
   (b) Nominal Reinforcement in sectional elevation

PART-B (Marks:16x3=48)

3. Discuss the merits and demerits of the Traditional methods of design (Working stress method and ultimate load method).

4. (a) Discuss in brief basic assumptions of bending theory.
   (b) Drive expressions for the position of neutral axis and moment of resistance of balanced rectangular section.
   (c) How do you find the moment of resistance of a beam section?

5. When do steel reinforcements require splicing ? What is the length of bars that are usually available in the market ? Enumerate the methods used for splicing.

6. Design an axially loaded tied column 400mm x 400mm pinned at both ends with an unsupported length of 3m for carrying a factored load of 2300KN use M20 grade concrete and Fe 415 steel.

7. Design a continuous floor slab for an office building 12m long and 4m wide supported on floor beams spaced at 3m c/c. The live load on slab is $2.5kN/m^2$. Concrete of grade M 20 and are used.

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR310103 **Set No. 3**

III B.Tech I Semester Regular Examinations, November 2006
STRUCTURAL ENGINEERING DESIGN AND DRAWING-I(RCC)
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any ONE Question from PART-A
and any THREE Questions from PART-B
Note:Assume suitable data whenever necessary
Use of IS codes & Structural Tables is permitted

⋆ ⋆ ⋆ ⋆ ⋆

PART-A(Marks:32)

1. Design a simply supported Rectangular Beam to carry 30kN/m superimposed load over a span of 6m on 460mm wide supports. Use M_{20} grade concrete and Fe 415 grade steel. Check the design for all necessary conditions. Draw to a suitable scale.

   (a) Longitudinal Section showing reinforcement details.

   (b) The cross section of the Beam at salient points, showing reinforcement details.

2. Design a isolated footing for a rectangular column 300 x 450mm carrying an axial load of 1000 kN. The net bearing capacity of the soil is $120kN/m^2$. Use M20 grade concrete and Fe 415 grade steel.

   Draw to scale the reinforcement details.

   (a) Plan of the footing

   (b) Sectional elevation of the footing.

PART-B (Marks:16x3=48)

3. (a) Is the limit state method in any way a better method of design of concrete structures than the working stress design? Give reasons for your answer.

   (b) Enumerate the five limit states commonly used in limit state design and state briefly how they are provided for in design.

4. What is meant by limit state? Discuss the different limit states to be considered in reinforced concrete design.

5. Determine the shear stress in a 250 X 500 mm rectangular section if the shear force is 20 kN and torsional moment is 10 kN.m at service loads. Asume M 20 mix and 0.75% tension reinforcement at an effective coverof 50 mm.

6. (a) How does bracing effect the behavior of slender columns? Explain how bracing can be provided for columns in Multistoried buildings.

(b) A column 350 x 350mm has an unsupported length of 8m and equivalent length of 5m both the axes. It is loaded with characteristic loads P=500KN, M_{xx}(top)=40KN-m M_{xx} (bottom)=-25KN-M. Assuming the column is bent in double curvature design the longitudinal steel. Use M30 & Fe415.

7. Design a one way simply supported slab of span 4.5m to cary a live load of $4kN/m^2$ floor finish of $1kN/m^2$ and partitions $1kN/m^2$. Use M 20 grade concrete and Fe 415 grade TOR steel.

⋆ ⋆ ⋆ ⋆ ⋆

Code No: RR310103 **Set No. 4**

III B.Tech I Semester Regular Examinations, November 2006
STRUCTURAL ENGINEERING DESIGN AND DRAWING-I(RCC)
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any ONE Question from PART-A
and any THREE Questions from PART-B
Note:Assume suitable data whenever necessary
Use of IS codes & Structural Tables is permitted

⋆ ⋆ ⋆ ⋆ ⋆

PART-A(Marks:32)

1. Design a simply supported Rectangular Beam to carry 30kN/m superimposed load over a span of 6m on 460mm wide supports. Use M_{20} grade concrete and Fe 415 grade steel. Check the design for all necessary conditions. Draw to a suitable scale.
   (a) Longitudinal Section showing reinforcement details.
   (b) The cross section of the Beam at salient points, showing reinforcement details.

2. Design an isolated circular footing for a square column of 500mm diameter is transmitting a load of 900 kN to a soil having an allowable bearing capacity of $90kN/m^2$. Use M20 concrete and Fe 415 grade steel. Draw to scale showing reinforcement details
   (a) Plan of the footing
   (b) Sectional elevation of the footing.

PART-B (Marks:16x3=48)

3. (a) Discuss in Detail partial safety factors for loads.
   (b) Sketch the characteristics and design stress-Shan curves for Fe 415 grade cold worked steel.

4. (a) Why does the code impose minimum and maximum limits with regard to
      i. spacing
      ii. Percentage area of flexural reinforcement.
   (b) What the advantages and disadvantages of providing large clear cover to reinforcement in flexural members.

5. (a) Calculate the stresses produced in a rectangular beam 350 X 800mm due to torsion of 30KNm. What is the nature of these stresses and what type of reinforcements should be provided to resist these stresses?
   (b) Sketch the pattern of cracking in a beam under torsional moment.

6. Design an axially loaded tied column 400mm x 400mm pinned at both ends with an unsupported length of 3m for carrying a factored load of 2300KN use M20 grade concrete and Fe 415 steel.

7. Design the end span of a one way continuous slab for the following data: span =5m, live load = $3kN/m^2$ partitions = $1kN/m^2$ floor finish $0.75kN/m^2$. Concrete; M 20 grade and steel: Fe - 415 grade.

⋆ ⋆ ⋆ ⋆ ⋆