

Code No: V3106

R07

Set No: 1

III B.Tech. I Semester Supplementary Examinations, November/December - 2012

DESIGN OF REINFORCED CONCRETE STRUCTURES**(DESIGN AND DRAWING)**

(Civil Engineering)

Time: 3 Hours**Max Marks: 80**

Note: Answer any ONE question from PART-A carries 32 marks and THREE question from PART-B each carries 16 marks

Use of IS-456-2000 and design charts from SP-16 is allowed

Part A

1. Design a continuous RC slab for a hall 6 m and 13.5 m long. The slab is supported on RCC beams each 250mm wide which are monolithic. The ends of the slab are supported on walls 300mm wide. Design the slab for a live load of 2.75 kN/m^2 . Assume the weight of roof finishing equal to 1.5 kN/m^2 . Use M20 concrete and Fe 415 steel. Draw to scale the plan and cross sections.

(or)

2. Design a footing for to a rectangular column 30cm x 45cm carrying an axial service load of 1000 kN. The net bearing capacity of soil is 120 kN/m^2 . The unit weight of earth is 20 kN/m^3 . Use $\sigma_y = 415 \text{ N/mm}^2$ and $\sigma_{ck} = 20 \text{ N/mm}^2$. Draw to scale the plan and elevation..

Part B

3. a) Why water is essential for concrete making?
b) Discuss the requirements for mixing water for concrete. Why seawater is not normally recommended
c).A rectangular beam section is 20cm wide and 35 cm deep up to the center of tension steel, consist of 4-16mm TOR bars. Find the position of the neutral axis, the lever arm, forces of compression and tension, cracking moment and safe moment of resistance of concrete. Use M20 concrete and Fe500 grade steel.
4. The T beam floor consists of 12cm thick R.C. slab monolithic with 30cm wide beams. The beams are spaced at 3.5m center to center and their effective span is 8m. If the superimposed on the slab is 6.5 kN/m^2 , design an intermediate beam and an end beam. Use M20 mix and TMT 415 grade steel.
5. An RC beam has an effective depth of 450mm and breadth of 300mm. It contains 5-20mm bars mild steel out of which two bars are curtailed at a section where shear force at service load is 150kN. Design the shear reinforcement if the concrete is of M20 grade.

Code No: V3106**R07****Set No: 1**

6. Design a slender unbraced rectangular column with the following data. Column size 35cm x 45cm. Effective length $l_x = 4\text{m}$. Effective length $l_y = 3.5\text{m}$. Factored Axial load = 400kN. Factored Moment in the direction of larger dimension = 50kNm. Factored Moment in the direction of shorter dimension = 20kNm. Unsupported length = 6 m
7. The section of a cantilever beam designed for a span of 5.0m is having dimensions 300 x 600mm with 3 numbers 28mm diameter bars in compression and 3 numbers 20mm diameter bars in tension. The beam has been designed for a bending moment of 200kNm (at support) under service loads, of which 70 percent is due to permanent (dead) loads. The loading is uniformly distributed on the span. Assume M20 concrete and Fe 415 steel.
 - (a) Calculate the maximum short-term deflection
 - (b) The short-term deflection due to live loads alone.

FirstRanker

Code No: V3106

R07

Set No: 2

III B.Tech. I Semester Supplementary Examinations, November/December - 2012

**DESIGN OF REINFORCED CONCRETE STRUCTURES
(DESIGN AND DRAWING)**

(Civil Engineering)

Time: 3 Hours**Max Marks: 80**

Note: Answer any ONE question from PART-A carries 32 marks and THREE question from
PART-B each carries 16 marks

Use of IS-456-2000 and design charts from SP-16 is allowed

Part A

1. The T beam floor consists of 12cm thick R.C. slab monolithic with 30cm wide beams. The beams are spaced at 4.0m center to center and their effective span is 7.5m. If the superimposed on the slab is 7.0 kN/m^2 , design an intermediate beam. Use M20 mix and TMT 415 grade steel. Draw to scale the longitudinal section, section at mid span, and corresponding cross sections.

(or)

2. Design a simply supported roof slab for a room 4.5 m x 6 m measuring from inside. Thickness of the wall is 400 mm. The superimposed load exclusive of the self weight is 2.5 kN/m^2 . The slab may be assumed to be simply supported on all four edges with corners held down. Use M20 mix and Fe 415 grade steel.
 - (a) Draw the reinforcement of the slab in plan view
 - (b) Draw cross section of the slab including beams with reinforcement details

Part B

3.
 - (a) Explain advantages and disadvantages of concrete as a building material
 - (b) What are Bougue's compounds.
 - (c) Design a balanced singly reinforced concrete beam with a span of 5m to carry a dead load of 35 kN/m and working live load of 30 kN/m. Use M20 mix and steel is of Fe 415 grade.
4.
 - (a) Discuss in detail partial safety factors for loads.
 - (b) Sketch the characteristics and design stress- strain curves for FE 415 grade cold worked steel.
 - (c) Find the moment of resistance of a beam section 25cm x 50cm deep is reinforced with 2-16mm bars in tension with an effective cover of 40mm. Use M20 concrete and Fe 500 grade of steel.
5. An RC beam is having dimension 25 cm x 50 cm overall is reinforced with 4-16mm Fe 415 bars in compression and 5-20mm Fe 415 bars in tension each at an effective cover of 40mm. Determine the shear resistance of the concrete beam if the mix is M25.
6. Design a short column 40cm square in cross section for an axial load of 500kN and bending moment of 50kNm and 30kNm about the two axes.

1 of 2

Code No: V3106**R07****Set No: 2**

7. Design an isolated square column 450mm x 450mm reinforced with 8- 25mm diameter bars carrying a service load of 2000 kN The bearing capacity of soil is 250 kN/m² at a depth of 1.5m below ground. The footing is restricted to 2.0m in one direction Assume M20 grade concrete and Fe 415 grade steel for the footing and M25 concrete and Fe 415 steel for the column.

FirstRanker

Code No: V3106

R07

Set No: 3

III B.Tech. I Semester Supplementary Examinations, November/December - 2012

**DESIGN OF REINFORCED CONCRETE STRUCTURES
(DESIGN AND DRAWING)**

(Civil Engineering)

Time: 3 Hours**Max Marks: 80**

Note: Answer any ONE question from PART-A carries 32 marks and THREE question from PART-B each carries 16 marks

Use of IS-456-2000 and design charts from SP-16 is allowed

Part A

1. The panel of slab is 4 m × 6 m. One short edge and long edge of the slab are discontinuous and other short edge and long edges are continuous. The slab is restrained with edge beam. Superimposed load is 4.5 kN/m² and floor finishes being 1.5 kN/m². Design the slab. Use M20 concrete and Fe 415 steel. Adopt limit state method. Assume mild exposure condition. Draw to scale the cross section of the slab showing the reinforcement data

(or)

2. Design a simply supported rectangular beam to carry 50 kN/m superimposed load over a span of 4 m on 400mm wide supports. Use M20 grade concrete and Fe 415 grade steel. Check the design for all necessary conditions. Draw to a suitable scale
 - (a) Longitudinal section showing the reinforcement details.
 - (b) The cross section of the beam at salient points, showing reinforcement details

Part B

3. (a) What are the assumptions for the design of a reinforced concrete section for limit state of collapse in bending? .
 - (b) Derive the stress block parameters for a rectangular cross section
4. A rectangular cantilever beam of span 5 m is 40 cm x 60 cm in cross section. Bending moment at the support due to uniformly distributed service loads is 250 kNm out of which 50% moment is due to permanent loads. Check the beam for deflection. It carries 3-25mm bars in tension and an effective cover of 50mm. $\sigma_y = 415 \text{ N/mm}^2$ and $\sigma_{ck} = 20 \text{ N/mm}^2$.
5. Design a plain concrete footing for to a rectangular column 30cm x 30cm carrying an axial service load of 400 kN (under service loads due to dead and live loads). The net bearing capacity of soil is 350 kN/m². At a depth of 1.2 m below ground level. Use $\sigma_y = 415 \text{ N/mm}^2$ and $\sigma_{ck} = 20 \text{ N/mm}^2$
6. (a) What is meant by slenderness ratio of a compression member and what are its implications.
 - (b) Distinguish between short and long column.
 - (c) Design a square column 7m long to carry an axial load of 600kN if its size is restricted to 40cm. Both ends of the column are hinged. Use helical reinforcement

Code No: V3106

R07

Set No: 3

7. An RC beam has an effective depth of 450mm and breadth of 230mm. It contains 5-20mm bars mild steel out of which two bars are bent up at 30 degrees near the support in tension. Calculate the shear resistance of the bent up bars. What additional stirrups are needed if it has to resist a design shear force of 150 kN. Use M20 concrete.

FirstRanker

Code No: V3106

R07**Set No: 4**

III B.Tech. I Semester Supplementary Examinations, November/December - 2012

DESIGN OF REINFORCED CONCRETE STRUCTURES**(DESIGN AND DRAWING)**

(Civil Engineering)

Time: 3 Hours**Max Marks: 80**

Note: Answer any ONE question from PART-A carries 32 marks and THREE question from PART-B each carries 16 marks

Use of IS-456-2000 and design charts from SP-16 is allowed

Part A

1. A RCC column of size 230×300 mm carrying a characteristic load of 1500kN. The safe bearing capacity of the soil is 150 kN/m^2 . Design an isolated square sloped footing. The materials are M20 grade concrete and HYSD reinforcement of grade Fe 415 for both the column and footing. Draw the details of the reinforcement showing the plan and section of the details.

Or

2. Design the flexural reinforcement for the rectangular concrete beam $230 \text{ mm} \times 400 \text{ mm}$ simply supported on two masonry walls 230 mm thick and 5 m apart. The beam has to carry in addition to its own weight a distributed live load of 10 kN/m , dead load of 5 kN/m and a concentrated dead load of 30 kN placed at the mid span point. Assume that the beam is subjected to moderate exposure conditions and grade of steel is Fe415 used draw to suitable scale longitudinal section and cross section of the beam.

Part B

3. (a) Explain process of Hydration of cement.
(b) Explain in detail the influence of various complex compounds in liberation of heat from setting cement.
(c) Explain quality of water to be used for mixing concrete.
4. An RC beam has an effective depth of 400 mm and breadth of 230 mm . It contains 6- 20 mm bars mild steel out of which three bars are bent up at 30 degrees near the support. in tension. Calculate the shear resistance of the bent up bars. What additional stirrups are needed if it has to resist a design shear force of 100 kN . Use M20 grade Concrete .
5. Design a slender circular column of 40 cm diameter with the following data. Unsupported length = 8 m . Effective length = 6.5 m . Axial load = 500 kN . Moment at top = 50 kNm . Moment at bottom = 35 kNm . The column bends in double curvature.

Code No: V3106**R07****Set No: 4**

6. The section of a cantilever beam designed for a span of 5.0m is having dimensions 300 x 600mm with 3 numbers 28mm diameter bars in compression and 3 numbers 20mm diameter bars in tension. The beam has been designed for a bending moment of 200kNm (at support) under service loads, of which 70 percent is due to permanent (dead) loads. The loading is uniformly distributed on the span. Assume M20 concrete and Fe 415 steel.
- (a) Calculate the maximum short-term deflection
- (b) The short-term deflection due to live loads alone.
7. Design a two-way slab simply supported on all the four edges for a room 6m x 3.5m clear in size. The superimposed working load is 3.5 kN/m^2 and (i) corners held down and (ii) corners not held down.

FirstRanker