RR-310103

Set No: 1

III-B.Tech I-Semester Supplementary Examinations, April/May-2005
STRUCTURAL ENGINEERING DESIGN AND DRAWING
(Civil Engineering)

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

Answer any ONE question from PART-A & THREE from PART-B
Use of IS codes & Structural Tables is permitted

PART-A (32 Marks)

1. Design a two-way slab for an office floor (4m × 6m) having two adjacent edges discountinuous using M-20 grade of concrete and Fe-415 grade HYSD bars to withstand a live-load of 4kN/m^2.
   Draw to a suitable scale the plan and section showing the details of reinforcement.

OR

2. An R.C. beam (350 mm wide and 550 mm effective depth is reinforced with 4 Nos. 20 mm dia. bars out of which two bars are bent by near the support section where the factored S.F = 400kN. Adopting M-20 grade of concrete and Fe-415 grade steel design suitable shear reinforcement. Draw to a suiable he L.S. and C.S showing the details of reinforcement.

PART-B (16 X 3 = 48 Marks)

3. Design an R.C. column (400 × 600 mm) to carry an axial working load of 2000kN. The column has an unsupported length of 3m and is braced against sides way in both directions. Adopt M-20 grade concrete and Fe-415 HYSD bar. Sketch the reinforcement details.

4. A square column of side 400 mm supports an axial service load of 1000kN, the S.B.C of soil = 200kN/m^2. Design the footing using M-20 grade concrete and Fe-415 HYSD bars. Sketch the details of reinforcement.

5. Find the live-load which an R.C. beam of span 4m can carry if has a rectangular section 230 mm × 480 mm) and has 4 rods of 20 mm dia as tension reinforcement. M-20 grade concrete and Fe-250 grade seel is used.

6. Design a cantilever beam which is monolithic with an R.C. column 300 mm wide an 450 mm deep, the clear span being 2.5 m. Take the allowable stresses as f_{ck} = 20 N/mm^2 and f_y = 415 N/mm^2. Sketch the details of reinforcement.

Contd….2

7. Write short notes on any THREE of the following:
   a) Safety factors.
   b) Characteristic and Design loads.
   c) Shear-transfer mechanism.
   d) Development length.

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Set No: 2

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STRUCTURAL ENGINEERING DESIGN AND DRAWING
(Civil Engineering)

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

Answer any ONE question from PART-A & THREE from PART-B
Use of IS codes & Structural Tables is permitted

PART-A

1. An R.C. beam of rectangular section (350 × 700 mm) is subjected to an ultimate B.M of 200kN-m and ultimate torsional moment of 100kN-m. Adopting M-20 grade of concrete and Fe-415 HYSD bars design suitable longitudinal and transverse reinforcemens for the section. Draw to a suitable scale the L.S and C.S of the beam showing the details of reinfocrement.

OR

2. Desing a two-way slab for a room (4m × 5m) with simply-supported edges on all the edges with corners prevented from lifting to support a live load of 4 kN/m^2. Adopt M-20 grade of concrete and Fe-415 grade HYSD bars. Draw to a suitable scale the plan and section showing the details of reinforcement.

PART-B

3. A rectangular concrete beam (300 × 600 mm) reinforced with 3 Nos. 25 mm dia bars. The factored S.F on the section is 200kN. Design suitable shear reinforcement if M-15 grade concrete and Fe-250 grade mild steel is used. Sketch the reinforcement details.

4. Design a short R.C. column 400 × 600 mm subjected to an ultimate axial load of 1600kN together with ultimate moment of M_{ux} = 120 kN-m and M_{uy} = 90kN/m. The concrete used is M-20 grade and Fe-415 grade steel d'/D = 0.1. Sketch the details of reinforcement.

5. Design a suitable footing for an R.C. column (300 × 500 mm) to support a factored axial load of 1500kN. The S.B.C. of soil is 200kN/m^2. Use M-20 grade concrete and Fe-415 grade steel. Sketch the details of reinforcement.

Contd….2

6. Check the development length at the supports of a simply-supported beam of 8 m span, reinforced with 6 Nos. 25 mm at mid span (50% bars are cranked). The toal characeristic live load = 50 kN/m. f_{ck} = 20 N/mm^2 and f_y = 415 N/m^2.

7. Write short notes on any THREE of the following:
   a) Philosophy of L.S.D
   b) Expressions for characteristic loads
   c) Shear failure mehcanism
   d) Band machanicsm.

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Code No: RR-310103

Set No: 3

III-B.Tech I-Semester Supplementary Examinations, April/May-2005
STRUCTURAL ENGINEERING DESIGN AND DRAWING
(Civil Engineering)

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

Answer any ONE question from PART-A & THREE from PART-B
All questions carry equal marks
Use of IS codes & Structural Tables is permitted

PART-A

1. Design a continuous one-way slab for an office floor (continuous over T beams spaced at 4m c/c) for a live-load of 4 kN/m^2 using M-20 grade of concrete and Fe-415 grade HYSD bans. Illustrate the details of reinforcement by drawing to a suitable scale two views.

OR

2. Design a doubly reinforced beam of effective span 8m to carry a live-load of 30kN/m of width 300mm, if the overall depth is restricted to 650mm. Use M-20 grade of concrete and Fe - 415 grade HYSD bans.
Draw to a suitable scale the L.S. and C.S. showing the details of reinforcement.

PART-B

3. A rectangular concrete beam (300 x 600mm) is reinforced with 3 Nos. 25mm dia. bans. It is subjected to a factored B.M. = 150 kN, torsional moment = 20kN-m and S.F = 200kN. Design the reinforcement using M-15 grade concrete and Fe-250 grade concrete. Sketch the reinforcement details.

4. Design the footing of a circular column of 300mm dia. R.C. column to carry an ultimate load of 750kN. The S.B.C. of soil is 200kN/m^2. M-20 grade and Fe - 415 grade steel is used.

5. Design an R.C. column of size 300 x 400mm subjected to an ultimate load of 1200kN and an ultimate moment of 200kN-m with respect to the major axis. Adopt M-20 grade concrete and Fe-415 grade steel. Sketch the details of reinforcement.

Contd….2

6. Design a two-way slab for a room (4 x 5m) with discontinuous and simply supported edges on all the 4 sides with corners prevented from lifting to support a live load of 4 kN/m^2. Adopt M-20 grade concrete and Fe-415 grade steel. Sketch the reinforcement details.

7. Write short notes on any THREE of the following:-
   a) Safety and serviceability
   b) LSD and Reliability theory
   c) Balanced, under-rein forced and over- reinforced beams.
   d) Types of failure in beams subjected to combined bending and torsion.

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Code No: RR-310103

Set No: 4

III-B.Tech I-Semester Supplementary Examinations, April/May-2005
STRUCTURAL ENGINEERING DESIGN AND DRAWING
(Civil Engineering)

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

Answer any ONE question from PART-A & THREE from PART-B
All questions carry equal marks
Use of IS codes & Structural Tables is permitted

PART-A

1. Design a continuous R.C. beam of rectangular section to carry a live-load of 12 kN/m in addition to a superimposed load of 10kN/m over 3 spans of 6m each. Assume the ends as simply-supported. Use M-20 grade of concrete and Fe-415 grade HYSD bars. Draw the reinforcement details to suitable scale. (L.S. and C.S.)

OR

2. Design a two-way slab (4m x 6m) continuous on all the edges and supported on 300mm wide beams to serve as an office floor use M-25 grade of concrete and Fe-4l5 grade steel. Draw to a suitable scale the plan and section showing the details of reinforcement.

PART-B

3. An R.C. beam 300 x 600 mm (effective depth) has 3 Nos 20mm dia as tension steel along with 8mm dia 2 legged stirrups at 200mm spacing as shear reinforcement. M-20 grade concrete and Fe-415 HYSD bars are used. Estimate the shear strength of the support section.

4. Design a 300mm dia concrete column to carry a factored load of 1500kN. Use herical reinforcement, M-20 grade of concrete and Fe- 415 grade steel. The unsupported length of the column is 3m. The column is braced against sidesway. Sketch the reinforcement details.

5. Design the footing for a circular column of 300mm dia. To support an ultimate load of 750kN. The S.B.C. of soil = 200k/N/m^2. Use M-20 grade concrete and Fe-415 grade steel. sketch the reinforcement details.

6. A centilever beam 200mm wide and 300mm in effective width supports a u.d.l and is reinforced with 4 Nos 16mm dia. rods in tension. If the factored total load = 80kN, calculate .
   a) The max. local bond stress.
   b) The anchorage length required and the
   c) Average bond stress, if the anchorage length provided = 1m.

Contd….2

7. Write short notes on any THREE of the following:-
   a) Limit states
   b) Characteristic and Design strength
   c) Assumptions made in L S D for Flexure
   d) Influence of axial force on design shear strength.

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