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10CV62

**Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Design and Drawing of RC Structures**

Time: 4 hrs.

Max. Marks:100

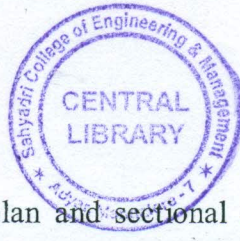
- Note: 1. Answer TWO full questions from Part-A and ONE full question from Part-B.**  
**2. Use of IS:456-2000 and SP-16 is permitted.**  
**3. Missing data may be suitably assumed.**

**PART – A**

- 1 Draw plan of a two way slab with corners held down condition for the following data :
- Room dimension : 5 m × 4 m  
 Thickness of slab : 120 mm  
 Reinforcement in middle strip:  
     Parallel to shorter edge: # 10 mm @ 150 mm c/c  
     Parallel to longer span: # 8 mm @ 175 mm c/c  
 Reinforcement in edge strip:  
     Parallel to shorter edge: # 8 @ 100 c/c  
     Parallel to longer span: # 8 @ 150 c/c  
 Corner Reinforcement:  
     # 8 @ 100 c/c provided as a mesh over a grid of 800 mm × 800 mm  
 Prepare a bar bending schedule. (20 Marks)
- 2 Draw to a suitable scale the sectional elevation of a flight of stairs showing the reinforcement details for the following data prepare a bar bending schedule:
- Number of steps in each flight = 12  
 Tread = 300 mm  
 Rise = 150 mm  
 Stair Hall = 5.5 m × 2.5 m  
 Thickness of waist slab = 180 mm  
 Width of stair = 1200 mm  
 Main bars = 7 numbers 12 mm dia  
 Distribution steel = dia 8 mm @ 250 c/c  
 Landing beam = 230 × 300 mm  
 Floor height = 3.6 m  
 The stair spans between the landing beam concrete grade and steel = M20 and Fe415  
 Effective cover to reinforcement = 20 mm (20 Marks)

Important Note : 1. On completing your answers, carefully draw diagonal cross lines on the remaining blank spaces.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.





- 3 Draw to a suitable scale the plan and sectional elevation of column and footing for the following requirement:
- Size of column =  $230 \times 600$  mm  
Reinforcement in column =  $6 - 20 \phi$   
Lateral ties =  $6\phi @ 230$  c/c  
Size of footing =  $1.75 \text{ m} \times 2.0 \text{ m}$   
Reinforcement in footing:  
Long bars =  $10 - 10\phi$   
Short bars =  $13 - 10\phi$   
Thickness of footing at the face of the column =  $1000$  mm  
Thickness at the edge =  $250$  mm  
Concrete grade = M25  
Steel = Fe 415  
Prepare a bar bending schedule. (20 Marks)

**PART - B**

- 4 Design a combined footing for two columns of size  $300 \times 300$  mm and  $400 \times 400$  mm subjected  $500$  kN and  $700$  kN respectively. The centre to centre spacing between columns is  $3.5$  m. The width of the footing is restricted to  $1.5$  m. Take safe bearing capacity of soil =  $150 \text{ kN/m}^2$ . Use M25 concrete and Fe 415 steel. (35 Marks)
- Design slab and beam type combined footing.  
Draw to a suitable scale.
- Longitudinal section of footing
  - Cross sections of footing. (25 Marks)
- 5 Design a cantilever retaining wall to retain an earth embankment with a horizontal top  $4\text{m}$  high above ground level. The density of earth is  $18 \text{ kN/m}^3$  and its angle of repose is  $30^\circ$ . The embankment is horizontal at top. The safe bearing capacity of soil is  $200 \text{ kN/m}^2$ . The coefficient of friction between soil and concrete is  $0.5$ . Adopt M20 Grade concrete and Fe 415 grade steel. (40 Marks)
- Draw to a suitable scale.
- Cross section of retaining wall.
  - Longitudinal section.
  - Sectional plan of top and bottom showing details of reinforcement in base slab. (20 Marks)

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