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10CV62

**Sixth Semester B.E. Degree Examination, June/July 2018**  
**Design and Drawing of RCC Structures**

Time: 4 hrs.

Max. Marks:100

**Note: 1. Answer any TWO full questions form Part – A**  
**ONE full question from Part –B.**

**2. Use of IS : 456 – 2000 and SP – 16 is permitted.**

**PART – A**

- 1** A square RCC column and footing has the following details :
- Column size = 300 × 300 mm  
 Size of footing = 1.5 M × 1.5 M, thickness of footing 450mm near column face and tapered to 200mm near the edges  
 Depth of foundation below ground level = 1M  
 Height of column to be shown above ground level = 1M  
 Column reinforcement = 8 numbers of 16mm  $\phi$  as main bars with 8mm  $\phi$  @ 150mm c/c lateral ties  
 Footing reinforcement = 12 mm  $\phi$  @ 150mm c/c on both ways  
 Draw to a suitable scale, the following :
- Sectional plan of column and footing
  - Sectional elevation of column and footing. **(20 Marks)**
- 2** A rectangular beam of size 230mm × 500mm is continuous over number of columns spaced at 4.5 M c/c. The width of column is 300 mm main reinforcement:
- @ mid span of +ve steel → 4 # 20  
 @ support of –ve steel → 4 # 20  
 Shear reinforcement : 2L 8 mm  $\phi$  vertical stirrups @ 140mm c/c  
 Draw to a suitable scale, the following :
- Longitudinal sectional elevation of beam
  - Cross section of beam @ mid span and end section. **(20 Marks)**
- 3** A RCC doglegged staircase has the following details :
- Staircase bars size (clear) = 5m × 2.5m  
 Floor to floor height = 3.15m  
 Rise = 150mm  
 Tread = 250mm  
 Waist slab thickness = 150mm  
 Width of staircase = 1.2m  
 Bearing = 230mm  
 Main steel = 12mm  $\phi$  @ 150 mm c/c  
 Dist. Steel = 10 mm  $\phi$  @ 180 mm c/c  
 Two landing beams of size 230mm × 250mm are provided with 2# 12mm  $\phi$  steel @ top and bottom, stirrups : 8mm  $\phi$  @ 200mm c/c.  
 Draw to a suitable scale, the following :
- Plan
  - Sectional elevation of two flights. **(20 Marks)**

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

PART - B

- 4 Design a RCC cantilever retaining wall to retain the levelled earth embankment 5m high above the ground level. The unit weight of earth is  $16 \text{ kN/m}^3$  and its angle of repose is  $30^\circ$ . The S.B.C of soil is  $145 \text{ kN/m}^2$ . The co-efficient of friction between soil and concrete is 0.55. Use M20 grade of concrete and steel grade Fe415. (40 Marks)  
Draw the following to a suitable scale :
- Sectional elevation of retaining wall showing the details of steel in stem, and base slab. (10 Marks)
  - Longitudinal section for 2m showing reinforcement of stem and base slab. (06 Marks)
  - Plan of base slab through center showing all reinforcements. (04 Marks)
- 5 Design combined footing for two RCC columns A and B, separated by a distance of 4m c/c column A is  $500\text{mm} \times 500\text{mm}$  and carries a load of 1250 kN and column B is  $600\text{mm} \times 600\text{mm}$  and carrier a load of 1600 kN. Take S.B.C of soil as  $200 \text{ kN/m}^2$ . Use M20 grade concrete and Fe415 steel. (40 Marks)  
Draw the following to a suitable scale :
- Sectional elevation (10 Marks)
  - Plan of bottom and top reinforcement (05 Marks)
  - c/s at two different places to show the maximum details of reinforcement. (05 Marks)

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