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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 ϕ as main bars with 8mm ϕ @ 150mm c/c lateral ties
Footing reinforcement = 12 mm ϕ @ 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 ϕ 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 ϕ @ 150 mm c/c
Dist. Steel = 10 mm ϕ @ 180 mm c/c
Two landing beams of size 230mm × 250mm are provided with 2# 12mm ϕ steel @ top and bottom, stirrups : 8mm ϕ @ 200mm c/c.
Draw to a suitable scale, the following :
- Plan
 - Sectional elevation of two flights.
- (20 Marks)



10CV62

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 kN/m^3 and its angle of repose is 30° . The S.B.C of soil is 145 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 :
- a. Sectional elevation of retaining wall showing the details of steel in stem, and base slab. (10 Marks)
 - b. Longitudinal section for 2m showing reinforcement of stem and base slab. (06 Marks)
 - c. 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 kN/m^2 . Use M20 grade concrete and Fe415 steel. (40 Marks)
Draw the following to a suitable scale :
- a. Sectional elevation (10 Marks)
 - b. Plan of bottom and top reinforcement (05 Marks)
 - c. c/s at two different places to show the maximum details of reinforcement. (05 Marks)

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