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10CV62

Sixth Semester B.E. Degree Examination, Jan./Feb. 2021
Design of Drawing of RC Structures

Time: 4 hrs.

Max. Marks:100

- Note:** 1. Answer any TWO full questions from Part-A and any ONE question from Part-B.
2. Use of IS456-2000, SP-16 is permitted.
3. Missing data may be suitably assumed and stated.

PART - A

- 1 A two way fixed slab for a hall of internal dimensions $4.5\text{m} \times 5.5\text{m}$ has the following details:
- Thickness of slab = 150mm.
 - Short span steel = 10mm # @ 120mm c/c.
 - Long span steel = 8mm # @ 140mm c/c.
 - Wall thickness = 250mm.
 - Torsion steel = 10mm # @ 170mm c/c.
 - Grade of concrete and steel = M20 & Fe415.

All the edges are discontinuous. Draw to a suitable scale the following :

- Plan showing reinforcement details.
- Cross section of slab @ mid span along short span.
- Cross section of slab @ mid span along long span.

(20 Marks)

- 2 The following are the details of dog – legged stair to connect two floors 3.60m apart.
- Staircase Dimensions = $2.2\text{m} \times 5\text{m}$.
 - Width of flight = 1m.
 - Tread = 250mm.
 - Riser = 150mm.
 - Width of landing = 1.2m.
 - RC slab supporting each flight = 150mm thick.

It is provided with main reinforcement consisting of 10mm @ 150mm c/c and Distribution reinforcement consisting of 6mm @ 200mm c/c. Draw to a suitable scale.

- The plan of staircase.
- C/s of RC stair showing the reinforcement details.
Take Fe415 grade steel and wall thickness as 250mm.

(20 Marks)

- 3 A rectangular RCC column and footing have the following details :
- Dimensions of column = $230\text{mm} \times 450\text{mm}$.
 - Size of footing = $1.2\text{m} \times 1.5\text{m}$.
 - Depth of footing at the face of column 450mm.
 - Depth of footing at the edges 150mm.
 - Depth of foundation below ground level is 1.5m.
 - Details of reinforcement

Column – ϕ 16mm – 8 numbers as main bar and ϕ 8mm @ 150mm c/c as lateral ties.

Footing – 10 mm ϕ @ 90mm c/c shorter direction

10mm ϕ @ 120mm c/c longer direction.

Use M20 grade concrete and Fe415 grade steel.

Draw to a suitable scale.

- Sectional plan of column scale.
- Sectional , elevation of column and footing.
- Prepare the bar bending schedule for footing steel and column steel upto 3m height above ground level.

(20 Marks)

PART – B

- 4 Design a combined footing for two columns of size 300×300 mm and 400×400 mm subjected to 500kN and 700kN respectively. The centre to centre spacing between column is 3.5m. The width of the footing is restricted to 1.5m. Take SBC of soil = 150KN/m^2 . Use M25 concrete and Fe415 steel. Design slab and beam type combined footing.

(40 Marks)

Draw to a suitable scale :

- Longitudinal section of footing.
- Cross – section of footing.

(20 Marks)

- 5 Design a Cantilever retaining wall to retain an earth embankment with a horizontal top 3.5m above ground level. Density of earth = 18KN/m^3 . Angle of internal friction $\phi = 30^\circ$. SBC of soil is 200KN/m^2 . Take coefficient of friction between soil and concrete = 0.5. Adopt M20 grade concrete and Fe415 steel.

(40 Marks)

Draw to a suitable scale.

- Cross section of retaining wall.
- Longitudinal section.

(20 Marks)
