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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 4.5m × 5.5m has the following details:
   i)   Thickness of slab = 150mm.
   ii) Short span steel = 10mm #@ 120mm c/c.
   iii) Long span steel = 8mm # @ 140mm c/c.
   iv) Wall thickness = 250mm.
   v)   Torsion steel = 10mm # @ 170mm c/c.
   vi) Grade of concrete and steel = M20 & Fe415.
   All the edges are discontinuous. Draw to a suitable scale the following :

   a. Plan showing reinforcement details.
   b. Cross section of slab @ mid span along short span.
   c. 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.
   i)   Staircase Dimensions = 2.2m × 5m.
   ii) Width of flight = 1m.
   iii) Tread = 250mm.
   iv) Riser = 150mm.
   v)   Width of landing = 1.2m.
   vi) 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.

   a. The plan of staircase.
   b. 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 :
   i)   Dimensions of column = 230mm × 450mm.
   ii) Size of footing = 1.2m × 1.5m.
   iii) Depth of footing at the face of column 450mm.
   iv) Depth of footing at the edges 150mm.
   v)   Depth of foundation below ground level is 1.5m.
   vi) 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.
  a. Sectional plan of column scale.
  b. Sectional , elevation of column and footing.
  c. 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 400×400mm 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 $= 150$KN/m^2. Use M25 concrete and Fe415 steel. Design slab and beam type combined footing. **(40 Marks)**
Draw to a suitable scale :
  a. Longitudinal section of footing.
  b. 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 $= 18$KN/m^3. Angle of internal friction $\phi = 30^0$. 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.
  a. Cross section of retaining wall.
  b. Longitudinal section. **(20 Marks)**

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