10CV62

Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Design and 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 IS 456, IS 3370 and SP16 are permitted.*

PART – A

1   A two way slab for a hall of internal dimensions 3.5 × 4.5m has the following details :
    i)   Thickness of the of slab   =   150mm
    ii)   Wall thickness   =   230mm
    iii)   10mm ϕ bar at 120mm C/C along short span
    iv)   8mm ϕ bar at 140mm C/C along long span
    v)   6mm ϕ bar at 120mm C/C along torsional steel
    vi)   8mm ϕ bar at 300mm C/C along edge strip
    vii) Grade of concrete and steel : M$_{20}$ and Fe415
    Draw to a suitable scale the following :
  a. Plan showing reinforcement detail :   **(08 Marks)**
  b. C/S of slab at mid span along short span   **(06 Marks)**
  c. C/S of slab at mid span along long span.   **(06 Marks)**

2   A doglegged staircase has to be provided for a public building with the staircase room of internal dimensions 2.60 × 5.0m supported on wall on either end. The following detail are given :
    i)   Widths of tread   =   250mm
    ii)   Rise   =   180mm
    iii)   Floor height   =   3.60m
    iv)   Number of steps in each flight   =   10
    v)   Waist slab thickness   =   160mm
    vi)   Wall thickness   =   230mm
    vii) Main reinforcement   =   12mm ϕ ω 120 mm C/C
    viii) Distribution reinforcement   =   12mm ϕ ω 120mm C/C
    ix)   Grade of concrete and steel   =   M$_{20}$ and Fe 415
    Draw to a suitable scale the following :
  a. Plan of stair   **(06 Marks)**
  b. Sectional elevation along first flight   **(07 Marks)**
  c. Sectional elevation along second flight.   **(07 Marks)**

3   An isolated column and footing has the following details.
    i)   Dimension of column   -   (300×300)mm
    ii)   Height of column   -   3m
    iii)   Main reinforcement in column   -   4 – 16mm ϕ
    iv)   Lateral ties in column   -   6mm ϕ ω 150mm C/C
    v)   Size of footing   -   1.20m × 1.20m
    vi)   Thickness of footing at face of column -   450mm
    vii) Thickness of footing at edges   -   150mm
    viii) Dept of foundation below G.L   -   1.20m
    ix)   Main reinforcement of footing in both ways -   100mm ϕ ω 90mm C/C
    x)   Grade of concrete and steel   -   M$_{20}$ and Fe 415
    Draw to a suitable scale, the following :
  a. Sectional plan of column and footing   **(06 Marks)**
  b. Sectional elevation of column and footing   **(08 Marks)**
  c. Prepare the bar bending schedule.   **(06 Marks)**

PART – B

4   Design a cantilever retaining wall to retain earth for a height of 4m. The backpill is horizontal. The density of the soil is 18kN/m^3. Safe bearing capacity of the soil 200 kN/m^2. Take co-efficient of friction between concrete and soil as 0.6. Angle of internal friction is 30°. Use M$_{20}$ concrete and Fe 415 steel.   **(40 Marks)**
Draw the following to a suitable scale :
   a.   C/S of retaining wall showing reinforcement details   **(10 Marks)**
   b.   Longitudinal section of the stem showing curtailment   **(06 Marks)**
   c.   Half plan of top and half plan of bottom of base slab.   **(04 Marks)**

5   A single bay fixed portal frame has an effective span of 7m and an effective height of 4.2m spacing of the portal frame is 4.2m. consider a live load of 3kN/m^2 on the slab. Column size is 230mm × 750mm shall be adopted. Design the portal frame considering M$_{20}$ concrete and Fe 415 steel. SBC of soil is 130kN/m^2.   **(40 Marks)**
Draw to a suitable scale
   a.   The sectional elevation of half the portal frame showing the detail of reinforcement is beam, column and footing.   **(12 Marks)**
   b.   C/S of column   **(04 Marks)**
   c.   Plan of footing.   **(04 Marks)**

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