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10CV62

Sixth Semester B.E. Degree Examination, July/August 2022
Design and Drawing of RC Structures

Time: 4 hrs.

Max. Marks:100

- Note:1. Answer any TWO questions from Part – A and any ONE question from Part - B.**
2. Use of SP 16, IS 465, IS 3370 is permitted.
3. Assume missing data suitably.

PART – A

- 1** One way continuous slab has been provided for a clear hall dimensions 7m wide 11.77m long. The slab is supported by RCC beams at inner position and walls of 230mm thickness at the outer edges. The following data are given :
- C/C distance of supporting beams = 3.0m.
 - Effective span of beams = 7.23m.
 - Beams are supported on walls of 0.23m thickness.
 - C/S of beam = 230mm × 450mm.
 - Beam depth is inclusive of slab depth.
 - Slab thickness = 120mm.
 - Main positive reinforcement at the end span = 8mm ϕ @ 100mm C/C.
 - Main positive reinforcement at other interior panels = 8mm ϕ @ 100mm C/C.
 - Negative reinforcement at all supports = 8mm ϕ @ 100mm C/C.
 - Distribution steel = 8mm ϕ @ 250mm C/C.
 - Grade of concrete and steel = M₂₀ and Fe415.

Draw to a suitable side the following :

- Sectional elevation.
 - Plan showing the details of reinforcements. (20 Marks)
- 2** A dog legged stair case has to be provided for a public building with the staircase room size 2.5m × 5.0m (internal). The following details are given below :
- Vertical distance between the floors = 3.6m.
 - Waist slab thickness = 200mm.
 - Wall thickness = 230mm.
 - Main reinforcement = 12mm ϕ @ 225mm C/C.
 - Distribution reinforcement = 8mm ϕ @ 200mm C/C.
 - Grade of concrete and steel used = M₂₀ and Fe415.

Draw to a suitable scale the following :

- Plan of the Stair case.
- Sectional elevation of the first flight.
- Prepare the bar bending schedule. (20 Marks)



- 3 An isolated footing of size $1.5\text{m} \times 2\text{m}$ is provided for a rectangular column of size $230\text{mm} \times 450\text{mm}$. The footing is tapered from 600mm thickness at the face of the column to 225mm thickness at the edges.

Reinforcement details :

Column : 8 numbers of 20mm diameter main bars arranging 3 Nos in each face of the column with lateral ties of 8mm ϕ @ 200mm C/C.

Footing : A mesh of 12mm diameter bars @ 125mm C/C along both directions.

Draw to a suitable scale :

- Sectional plan of footing.
- Sectional Elevation of footing.
- Bar bending schedule.

(20 Marks)

PART – B

- 4 A single bay fixed portal frame has an effective span of 8.0m and an effective height of 4.0m. the portal frames are spaced at 4.0m C/C. The Live load on roof is 1.5kN/m^2 and roof finish is 0.75 kN/m^2 may be considered. Design an Interior Portal frame, Continuous slab and Suitable footings for the columns. Adopt M_{20} grade concrete and Fe415 grade of steel.

Draw to a suitable scale.

- Structural details of the continuous slab (elevation).
- Sectional elevation of the portal frame showing the details of reinforcements.
- Structural details of the footing.

(60 Marks)

- 5 Design a cantilever retaining wall to retain an earth embankment 4.0m high above ground level. The density of earth is 18kN/m^3 and its angle of repose is 30° . The embankment is horizontal at top. The safe bearing capacity of the soil may be taken as 200kN/m^2 and the coefficient of friction between soil and concrete is 0.5. Adopt M_{20} grade concrete and Fe415 HYSD bars.

Draw to a suitable scale.

- Sectional elevation of the retaining wall showing the reinforcement details.
- Reinforcement details at the inner face of the stem.

(60 Marks)
