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10CV62

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Design and Drawing of R.C. Structures

Time: 4 hrs.

Max. Marks:100

**Note: 1. Answer any TWO full questions from Part-A
and ONE question from Part-B.**

2. Use of IS-456-2000 and SP-16 is permitted.

3. Assume missing data suitably.

PART - A

- 1 Draw longitudinal section and cross-section near the support of a simply supported doubly reinforced beam for the following data:
 Size of beam : 300 mm × 450 mm
 Clear span : 4.5 m
 Bearing on wall = 200 mm
 Thickness of wall = 300 mm
 Main reinforcement (HYSD) = Tensile 3 – 20 mm ϕ (One bar bentup at $l/7$)
 Compressive: 2 – 16 mm ϕ
 Stirrups = 8 mm ϕ 2-legged @ 200 mm c/c.
 Also prepare barbending schedule. (20 Marks)

- 2 A continuous oneway RCC slab 150 mm thick is provided for a college drawing hall 6.5m×13m size. The width of the wall is 300 mm. Main reinforcement 12 mm ϕ @ 150 mm c/c. Distribution reinforcement – 8 mm ϕ @ 200 mm c/c. Centre to centre distance between beams = 3.20 m, Size of beam is 300 mm × 600 mm. Slab is monolithic with beam reinforcement. Main reinforcement – 4 - 20 mm ϕ , 2-legged stirrups – 8 mm ϕ @ 150 mm c/c throughout. Draw the longitudinal section. (20 Marks)

- 3 Draw to a suitable scale sectional plan and elevation of a 500 mm square column with a footing with following details:
 Reinforcement in column :
 Main – 8 – 20 mm dia HYSD bars
 Lateral ties – 8 mm ϕ @ 300 mm c/c.
 Footing Details:
 Size = 2.20 m × 2.20 m
 Thickness of footing = 300 mm
 Reinforcement – 12 mm ϕ @ 150 mm c/c, Both walls
 Depth below G.L. = 1.0 m
 Plinth level = 300 mm above G.L.
 Height of ceiling above plinth level = 3.0 m
 Also prepare Bar bending schedule. (20 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.



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PART - B

- 4 Design a cantilever retaining wall to retain an earth embankment with a horizontal top 3.5 m above ground level density of earth = 18 kN/m^3 . Angle of internal friction $\phi = 30^\circ$. SBC of soil is 200 kN/m^2 . Take coefficient of friction between soil and concrete = 0.50. Adopt M20 grade concrete and Fe415 steel. (40 Marks)
- Draw
- a. C/s of retaining wall (10 Marks)
 - b. L/s of stem (06 Marks)
 - c. Sectional plan of heel slab. (04 Marks)
- 5 Design a slab and beam type rectangular combined footing for two columns of size $300\text{mm} \times 300\text{mm}$ and $400 \text{ mm} \times 400\text{mm}$ and subjected to an axial load of 800 kN and 1200 kN respectively. The columns are spaced at 4.0m c/c. The width of the footing is restricted to 1.8 m. Use M25 grade concrete and Fe415 steel. Assume SBC of soil = 180 kN/m^2 . (40 Marks)
- Draw to a suitable scale.
- (i) Longitudinal section of footing (15 Marks)
 - (ii) Cross-section of footing near big column. (05 Marks)

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