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 mmϕ (One bar bentup at l/7)
                                             Compressive: 2 – 16 mmϕ
Stirrups = 8 mmϕ 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 mmϕ @150 mm c/c. Distribution reinforcement – 8 mmϕ @ 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 mmϕ, 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 mmϕ @ 300 mm c/c.
Footing Details:
Size = 2.20 m × 2.20 m
Thickness of footing = 300 mm
Reinforcement – 12 mmϕ @ 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)**

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/m³. Angle of internal friction ϕ = 30°. SBC of soil is 200 kN/m². 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 300mm × 300mm and 400 mm × 400mm 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/m².   **(40 Marks)**
     Draw to a suitable scale.
     (i)   Longitudinal section of footing   **(15 Marks)**
     (ii) Cross-section of footing near big column.   **(05 Marks)**

* * * * *