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10CV62

Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016

Design and Drawing of RC Structures

Time: 4 hrs. Max. Marks:100

Note: 1. ***Answer TWO full questions from Part-A and ONE full question from Part-B.***
2. Use of IS:456-2000 and SP-16 is permitted.
3. Missing data may be suitably assumed.

PART – A

1 Draw plan of a two way slab with corners held down condition for the following data :
Room dimension : 5 m × 4 m
Thickness of slab : 120 mm
Reinforcement in middle strip:
Parallel to shorter edge: # 10 mm @ 150 mm c/c
Parallel to longer span: # 8 mm @ 175 mm c/c
Reinforcement in edge strip:
Parallel to shorter edge: # 8 @ 100 c/c
Parallel to longer span: # 8 @ 150 c/c
Corner Reinforcement:
8 @ 100 c/c provided as a mesh over a grid of 800 mm × 800 mm
Prepare a bar bending schedule. **(20 Marks)**

2 Draw to a suitable scale the sectional elevation of a flight of stairs showing the reinforcement details for the following data prepare a bar bending schedule:
Number of steps in each flight = 12
Tread = 300 mm
Rise = 150 mm
Stair Hall = 5.5 m × 2.5 m
Thickness of waist slab = 180 mm
Width of stair = 1200 mm
Main bars = 7 numbers 12 mm dia
Distribution steel = dia 8 mm @ 250 c/c
Landing beam = 230 × 300 mm
Floor height = 3.6 m
The stair spans between the landing beam
concrete grade and steel = M20 and Fe415
Effective cover to reinforcement = 20 mm **(20 Marks)**

3 Draw to a suitable scale the plan and sectional elevation of column and footing for the following requirement:

Size of column = 230 × 600 mm

Reinforcement in column = 6 – 20 ϕ

Lateral ties = 6ϕ @ 230 c/c

Size of footing = 1.75 m × 2.0 m

Reinforcement in footing:

Long bars = 10 - 10ϕ

Short bars = 13 - 10ϕ

Thickness of footing at the face of the column = 1000 mm

Thickness at the edge = 250 mm

Concrete grade = M25

Steel = Fe 415

Prepare a bar bending schedule. **(20 Marks)**

PART – B

4 Design a combined footing for two columns of size 300 × 300 mm and 400 × 400 mm subjected 500 kN and 700 kN respectively. The centre to centre spacing between columns is 3.5 m. The width of the footing is restricted to 1.5 m. Take safe bearing capacity of soil = 150 kN/m^2. Use M25 concrete and Fe 415 steel. **(35 Marks)**

Design slab and beam type combined footing.

Draw to a suitable scale.

i) Longitudinal section of footing

ii) Cross sections of footing. **(25 Marks)**

5 Design a cantilever retaining wall to retain an earth embankment with a horizontal top 4m high above ground level. The density of earth is 18 kN/m^3 and its angle of repose is 30°. The embankment is horizontal at top. The safe bearing capacity of soil is 200 kN/m^2. The coefficient of friction between soil and concrete is 0.5. Adopt M20 Grade concrete and Fe 415 grade steel. **(40 Marks)**

Draw to a suitable scale.

i) Cross section of retaining wall.

ii) Longitudinal section.

iii) Sectional plan of top and bottom showing details of reinforcement in base slab.

(20 Marks)

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