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10CV62

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Design and Drawing of RC Structures

Time: 4 hrs.

Max. Marks:100

Note: *1. Answer any TWO full questions from PART-A.*
2. Answer any ONE full question from PART-B.
3. Use of IS456 and IS3370 and SP-16 is permitted.
4. Assume suitable data, wherever necessary.

PART – A

1 A RCC building has the following details:
   i) Centre to centre dimension 16m × 24m
   ii) Column size = 200 × 400 mm
   iii) Spacing of column along longer dimension = 6 m c/c
   iv) Spacing of column along shorter dimension = 4 m c/c
   v) Total no. of columns = 25
   vi) Size of footing = 1.2 m × 1.4 m
   Prepare a layout plan to a suitable scale showing column centerline with grids, column and footing layout. **(20 Marks)**

2 A dog legged staircase for a residential building has following details :
   i) Staircase room internal dimension inclusive of mid and top landing = 2.50 m × 5.40 m
   ii) Vertical distance between floors = 3.30 m
   iii) Number of rises in each flight = 11 nos
   iv) Height of rises = 150 mm
   v) Thread of step = 300 mm
   vi) Waist slab thickness = 150 mm
   vii) Width of each flight = 1.10 m
   viii) Landing width = 1.20m, resting on brick masonry, 250 mm thick
   ix) Main reinforcement = # 12 at 150 mm c/c
   x) Distribution reinforcement = # 8 @ 150 c/c
   xi) Materials M20 and Fe415
   Draw to a suitable scale:
   a. Plan of staircase. **(08 Marks)**
   b. Sectional elevation of the two flights. **(12 Marks)**

3 A RC column is provided with a isolated trapezoidal footing with the following details:
   i) Column cross section = 300 mm × 450 mm
   ii) Height of column above G.L. = 3.0 m
   iii) Main reinforcement in column = 6 nos – # 16 dia. bars (3 bars each on two sides)
   iv) Transverse reinforcement in column = # 8 dia. at 200 mm c/c
   v) Footing size = 1.60 m × 1.80 m
   vi) Depth of foundation = 1.50 m below G.L.
   vii) Footing depth :
      A) At column face = 500 mm   B) At edge = 150 mm

viii) Footing reinforcement
   A) In direction parallel to longer direction = #12 dia. bars at 140 mm c/c
   B) In direction parallel to shorter direction = #12 dia. bars at 100 mm c/c
ix) Material grade : M20 and Fe 415.
Draw to a suitable scale :
a. Plan   (07 Marks)
b. Sectional elevation   (08 Marks)
c. Bar bending schedule, giving total weight of steel.   (05 Marks)

PART – B

4   Design a cantilever retaining wall to retain earth embankment of 3.75 m height. The embankment is horizontal at the top. The angle of internal friction for the soil = 30°. The SBC of the soil is 200 kN/m^2. Density of soil is 18 kN/m^3. Coefficient of internal friction between soil and concrete = 0.6. Adopt M20 and Fe415.
Prepare the following drawings to a suitable scale :
a. Sectional elevation of the retaining wall
b. Longitudinal sectional view of the wall.   (60 Marks)

5   Design a circular water tank to hold 6,00,000 litres of water. The overall height available is 4.75 m, with a freeboard of 250 mm. The tank is resting on firm ground having rigid joints between the wall and base slab. Adopt M20 concrete and Fe415 steel.
Prepare the following drawings to suitable scale :
a. Sectional elevation of the water tank wall and base.
b. Plan showing reinforcement detail in the base slab.   (60 Marks)

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