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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Sixth Semester, B.E. - Civil Engineering Semester End Examination; June/July - 2015 Design and Drawing of RCC Structure

Time: 4 hrs

Max. Marks: 100

- Note:** i) Answer any **TWO** full questions from **PART - A** and **ONE** full question from **PART - B**
ii) Use of IS 456, SP -16 and IS 3370 is permitted.
iii) Missing data, if any may suitably assumed.

PART - A

- 1 Following is the data of a staircase located in an residential building ;

Grade of concrete – M20

Grade of Steel – Fe 500

Grade of Stair – Dog legged

Vertical distance between ground & floor 3.30m

Rise-150mm, Tread-250 mm,

No. of flights = 2,

No. of Risers in Each Flight = 11,

Width of Stair = 1.1 m

Waist slab thickness = 200 mm

Main steel 10 mm ϕ @ 175 mm c/c

Distribution steel 8 mm ϕ @ 230 mm c/c

Both landing slab and waist slab span in the same direction. Prepare the necessary structured drawings along with bar binding schedule.

2. A column and footing is to be provided with the following details :

Column size – 350 mm x 350 mm

Longitudinal steel – 8 no. of 16 mm ϕ equally distributed

Lateral ties – 8 mm ϕ @ 230 mm c/c

Height of column – 3.5 m

Footing size – 2.2 m x 2.2 m

Steel – 10 mm ϕ @ 100 mm c/c both ways.

Depth of footing at the face of the column is 600 mm and 250 mm at the edge. Depth of excavation = 1.5 m. Grade of concrete – M20, Grade of steel-Fe 415

Draw to suitable scale;

i) Sectional elevation

ii) plan

iii) Prepare bar bending schedule.

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- 3 A beam of cross section 300 x 600 mm is supported on 4 columns which are equally spaced at a c/c distance of 3.6 m. The columns are of 300 mm x 300 mm in section. The positive reinforcement consist of 2 bars of 20 mm ϕ at the supports. Anchor bars consists of 2 bars of 16 mm ϕ along with a negative reinforcement of 1 bar of 16 mm ϕ at the supports. Shear reinforcement is of 8 mm ϕ 2LVS at 200 mm c/c throughout. Draw the longitudinal section and important cross sections. Grade of concrete M20, Grade of steel Fe 415. 20

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 = 30°. SBC of soil is 200 kN/m². Take coefficient of friction between soil and concrete as 0.5. Adopt M20 grade concrete and Fe 415 steel. Draw the following to suitable scale. 40
- i) Cross section of retaining wall ii) Longitudinal section of stem and base slab. 10
- 5 Design an open rectangular tank of size 3 m x 8 m x 3 m deep resting on a firm ground, assuming that the joint between wall and base slab is rigid. Use M25 grade concrete and Fe 415 steel. Draw the following to suitable scale. 40
- Cross section of water tank showing the reinforcement details in wall and base slab. 20

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