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10CV62

Sixth Semester B.E. Degree Examination, June/July 2019

**Design and Drawing of RC 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 is permitted.**  
**3. Missing data may be assumed.**

**PART – A**

- 1 A two way slab for a hall of inner dimension  $3\text{m} \times 5\text{m}$  has following details:  
Slab is discontinuous on all four edges  
Thickness of slab = 150 mm, thickness of wall = 230 mm  
Steel in short span = 10 mm dia @ 150 mm c/c  
Steel in longer span = 10 mm dia @ 175 mm c/c  
Torsional steel = 10 mm dia @ 160 mm c/c  
Grade of concrete = M20  
Grade of steel = Fe 415.  
Draw to a suitable scale the following:  
a. Plan showing the details of reinforcement  
b. C/S of slab at mid span along shorter span and longer span **(20 Marks)**
- 2 A rectangular RCC column and footing has the following details:  
Dimensions of column =  $230 \times 450$  mm  
Size of footing =  $2400 \times 1800$  mm  
Depth of footing at the junction = 500 mm  
Depth of footing edge = 300 mm  
Depth of foundation below ground level = 1500 mm  
Reinforcement details:  
Column: Longitudinal reinforcement =  $8 \# 16$  mm  $\phi$   
Lateral ties = 8 mm dia @ 180 mm c/c  
Footing: Shorter span = 12 mm  $\phi$  @ 100 mm c/c  
Longer span = 12 mm  $\phi$  @ 125 mm c/c  
Use M20 concrete and Fe415 steel.  
Draw the suitable scale, the following:  
a. Sectional plan of column and footing  
b. Sectional elevation of column and footing  
c. Prepare the bar bending schedule. **(20 Marks)**
- 3 A Dog legged staircase has following data:  
i) Hall dimensions =  $5.5 \times 2.6$  m  
ii) Vertical distance between the floor = 3.3 m  
iii) Thickness of waist slab = 180 mm  
iv) Width of stair = 1.25 m  
v) Step dimension – Tread = 300 mm, Rise = 150 mm

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.

- vi) Wall thickness = 0.23 m  
 vii) Reinforcement details  
     Main bars = 12 mm  $\phi$  @ 150 mm c/c  
     Distribution bars = 8 mm  $\phi$  @ 170 mm c/c

Use M20 concrete and Fe415 steel.

Draw to a suitable scale:

- a. Plan of staircase
- b. Sectional elevation
- c. Bar bending schedule

(20 Marks)

**PART – B**

- 4 Design a combined footing for two column size 400 × 400 mm and 600 × 600 mm carry loads of 600 kN and 1000 kN respectively. The c/c distance of the column is 4m. Take SBC of soil as 150 kN/m<sup>2</sup>. Use M20 concrete and Fe415 steel.

Draw the following to the suitable scale:

- a. Sectional elevation
- b. Plan of base slab
- c. C/S of different places to show the minimum details of shear reinforcement.

(60 Marks)

- 5 Design a cantilever retaining wall to retain earth embankment 5m high above ground level. The density of earth is 18 kN/m<sup>3</sup> and its angle of repose is 30°. The embankment is horizontal at the top. The safe bearing capacity of the soil is 200 kN/m<sup>2</sup> and the coefficient of friction between soil and concrete is 0.5. Adopt M20 concrete and Fe415 steel.

Draw to a suitable scale:

- a. Cross section of retaining wall
- b. Longitudinal section
- c. Sectional plan at top and bottom showing details of reinforcement in base slab.

(60 Marks)

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