



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:
- Plan showing the details of reinforcement
 - 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 = 230×450 mm
Size of footing = 2400×1800 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 ϕ
Lateral ties = 8 mm dia @ 180 mm c/c
Footing: Shorter span = 12 mm ϕ @ 100 mm c/c
Longer span = 12 mm ϕ @ 125 mm c/c
Use M20 concrete and Fe415 steel.
Draw the suitable scale, the following:
- Sectional plan of column and footing
 - Sectional elevation of column and footing
 - Prepare the bar bending schedule.
- (20 Marks)
3. A Dog legged staircase has following data:
- Hall dimensions = 5.5×2.6 m
 - Vertical distance between the floor = 3.3 m
 - Thickness of waist slab = 180 mm
 - Width of stair = 1.25 m
 - 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 ϕ @ 150 mm c/c

Distribution bars = 8 mm ϕ @ 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^2 . 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^3 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^2 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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