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10CV62

Sixth Semester B.E. Degree Examination, Feb./Mar. 2022**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; SP-16 and IS:3370 is permitted.****PART - A**

- 1** The interior panel of two way slab has a clear dimension of 4×5 m; thickness of slab 150 mm, thickness of brick wall 230 mm.
Reinforcement:
Short span: Positive steel: 12 # @ 150 mm c/c
Negative steel: 12 # @ 150 mm c/c
Long span: Positive steel: 10 # @ 200 mm c/c
Negative steel: 10 # @ 200 mm c/c
Use M20 Concrete and Fe-415 steel. The thickness of load bearing wall is 230 mm.
Draw to a suitable scale:
- Plan of top and bottom steel in the slab. (10 Marks)
 - Cross section parallel to long span. (05 Marks)
 - Bar bending schedule. (05 Marks)
- 2** The dog legged RCC staircase for an office building has a vertical distance between the floors as 3.6 m. The stair hall measures 3×6 m clear, width of flight is 1.3 m. It has the following details:
Waist slab thickness = 200 mm
Tread = 300 mm
Rise = 150 mm
Thickness of brick wall around staircase = 230 mm
Main reinforcement = 12#@150 mm c/c
Distribution steel = 10#@250 mm c/c
Materials: M20 grade concrete; Fe-415 steel
Draw to a suitable scale:
- Plan of geometry of D.L. stair. (08 Marks)
 - Sectional elevation of the first flight D.L. stair. (07 Marks)
 - Bar bending schedule. (05 Marks)
- 3** An isolated column and footing has the following details:
Dimension of column: 230×450 mm
Main reinforcement in column: 8-20#
Lateral ties in column: 8# at 175 mm c/c
Size of footing = 1.3×1.6 m
Thickness of footing at face of column = 500 mm
Thickness of footing at edges = 200 mm
Depth of foundation below ground level = 1.5 m



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Main reinforcement in:

Shorter direction – 12#@125 mm c/c

Longer direction – 10#@150 mm c/c

Materials: M20 Grade Concrete and Fe-415 Grade Steel

Draw to a suitable scale:

- a. Sectional plan of column and footing. (08 Marks)
- b. Sectional elevation of column and footing. (07 Marks)
- c. Bare bending schedule. (05 Marks)

PART – B

- 4 Design a cantilever type retaining wall with horizontal backfill to retain a soil of height 3.0 m above ground level with the below details:

Angle of repose = $\phi = 30^\circ$

S.B.C. of soil = 100 kN/m²

Density of soil = 18 kN/m³

Coefficient of friction between wall and ground = 0.5

Materials: M20 grade concrete and Fe-415 grade steel.

(40 Marks)

Draw the following views:

- a. C/S of retaining wall showing reinforcement details. (10 Marks)
- b. Longitudinal section showing curtailment. (10 Marks)

- 5 A single storey, single bay RCC central portal frame having an effective span of 7.5 m and an effective height of 4m.

Spacing of portal frames : 4.0 m c/c

L.L. on the slab : 4 kN/m²

S.B.C. of soil : 175 kN/m²

Thickness of slab : 150 mm. Ends are fixed.

Materials: M20 grade concrete and Fe 415 grade steel

Design the beam, column and footing with necessary check.

(40 Marks)

Draw to a suitable scale:

- a. Sectional elevation of half the portal frame showing reinforcement details of beam column and footing. (14 Marks)
- b. C/S of beam and column. (06 Marks)
