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06CV62

**Sixth Semester B.E. Degree Examination, May/June 2010**  
**Design and Drawing of RC Structures**

Time: 4 hrs.

Max. Marks:100

**Note: 1. Answer any TWO full questions from Part A and  
One full question from Part B.**

**2. Use of IS:456, SP – 16 are permitted.**

**PART – A**

- 1** An interior panel of a two way continuous slab for a hall has an effective size 4m x 6m. The details are as follows :

Thickness of slab = 180 mm

Wall thickness = 250 mm

Span steel : # 10 @ 160 for short span

# 10 @ 200 for long span

Support steel : # 12 @ 120 for short span

# 12 @ 160 for long span

Distribution steel : # 8 @ 200

Use M20 concrete and Fe 415 steel. Provide suitable effective cover based on severe exposure condition.

Draw to a suitable scale :

- a. Cross section of slab at mid span along short span. (06 Marks)
- b. Cross section of slab at mid span along long span. (06 Marks)
- c. Plan showing the details of all reinforcements. (08 Marks)

- 2** A RCC dog legged stair case has the following details :

Stair case hall : 2.2 m x 5m

Floor to floor height = 3.3 m

Rise = 150 mm

Tread = 300 mm

Waist slab = 2000 mm

Width of stair = 1.0 m

Bearing = 250 mm

No. of steps = 10 + 10

Main steel = # 12 @ 180

Distribution steel = # 8 @ 200

Materials : M20 concrete, Fe 415 steel.

Two landing beams are provided whose web size 250 x 250 with 2 - # 12 at bottom and top. Stirrups are # 8 @ 200 c/c throughout. Draw to a suitable scale, the following :

- a. Plan. (05 Marks)
- b. Sectional elevation along the first flight which starts from foundation. (08 Marks)
- c. Sectional elevation along the second flight. (07 Marks)

- 3 A rectangular RCC column and footing has the following details :
- Dimension of column  $300 \times 600$  mm  
 Size of footing  $2\text{m} \times 3\text{m}$   
 Depth of footing at the junction = 600 mm  
 Depth of footing at the edge = 200 mm  
 Depth of foundation = 1m  
 Details of steel :
- Column : 8 - # 16 as main bars with  
 # 8 @ 150 stirrups  
 Footing : # 16 @ 200 – shorter direction  
 # 16 @ 250 – longer direction
- Use M20 concrete and Fe 415 steel. Draw to suitable scale, the following :
- Sectional plan of column and footing. (05 Marks)
  - Sectional elevation of column and footing. (10 Marks)
  - Prepare bar bending schedule for footing steel and column steel up to 1m above ground level. (05 Marks)

### PART – B

- 4 Design a cantilever retaining wall to retain soil for a height of 4m above the ground level. The backfill is horizontal. Assume the following details :
- Density of back fill =  $16 \text{ kN/m}^3$   
 SBC of soil below wall =  $150 \text{ kN/m}^2$   
 Angle of repose =  $30^\circ$   
 Coefficient of friction = 0.55
- M20 concrete and Fe 415 steel are used. (35 Marks)
- Draw the following to suitable scale :
- Cross section of retaining wall. (10 Marks)
  - Longitudinal section of stem and base slab showing all steel for about 3 m length. (10 Marks)
  - Sectional plan showing the details of steel in toe and heel slab. (05 Marks)
- 5 a. Design a RCC portal frame having an effective span of 8 m and an effective height of 4m. The portals are spaced at 3.5 m c/c. The imposed load on slab is  $3 \text{ kN/m}^2$ . Assume SBC of soil as  $180 \text{ kN/m}^2$ . The bases of column are fixed. Use M20 concrete and Fe 415 steel. Assume the depth of slab as 160 mm. (35 Marks)
- b. Draw to a suitable scale the sectional elevation of half the portal frame showing the details of steel in beam, column and footing. Also show the cross sectional details of beam at mid span and support and the sectional details of column. (25 Marks)

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