Q.P.Code: 37772

(4 Hours) [Total Marks: 80]

1. Question **No 1** is **Compulsory.**

2. Attempt any **three** questions out of remaining questions.

3. Use of **IS CODES** is **permitted.**

4. **Assume** suitable data if required and **state** it clearly.

5. All sketches must be drawn on **drawing sheet.**

Q 1   Attempt following questions.

a.   Explain the conditions for which an underground water tank is designed.   **05**

b.   Explain the detailing in RCC structures with suitable examples   **05**

c.   Why cover is provided for reinforcement in RCC structures. Write the values   **05**
of cover provided for reinforcement provided in slab, beam, column,
foundation and water tank.

d.   Explain with neat sketch structural behavior of cantilever and counter fort   **05**
retaining wall.

Q 2   The framing plan of a school building is shown in Figure 1. Take live load as
4 kN/m^2 and floor finish load equal to 1.5 kN/m^2. All external walls are 230
mm thick and internal walls are 150 mm thick. Floor to floor height is 3.5 m.
Grade of concrete is M 20 and steel is Fe 415. All columns are 300mm
×300mm in size.

Design the beam B1-B2-B3   **16**
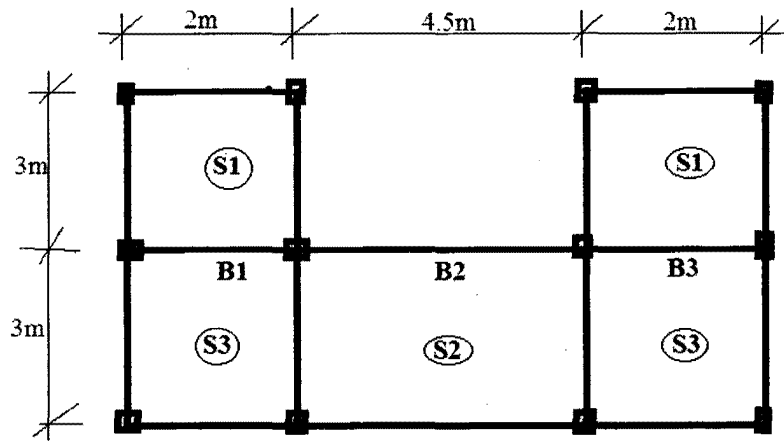
Draw reinforcement details.   **04**

TURN OVER

Figure 1

| Q 3 | Design a doglegged staircase for a building. Available room size is $3m \times 5m$. Floor to floor height is 3.2 m. Grade of concrete is M 25 and steel is Fe 415. | 14 |
	Draw the plan showing flight details, mid landing etc.	03
	Draw Reinforcement details in a flight	03

Q 4	Design by approximate method a rectangular tank 6 m × 5 m in plan and 4.8 in height. Tank is resting on firm ground. Grade of concrete is M25 and steel is Fe 415. Check the design for safe stresses.
	Design the following
	   (1) Side walls
	   (2) Base slab
		16

	Draw neat sketches showing the reinforcement details	04
Q 5	Design a reinforced concrete cantilever retaining wall supporting a backfill of height 5.5 m above ground. Take density of soil = 18 kN/m^3. Angle of repose = 30^0. SBC of soil = 160 kN/m^3 and coefficient of friction between concrete and soil =0.40. Grade of concrete is M25 and steel is Fe 415.	
	Design the wall and show all stability checks	16

TURN OVER

Draw reinforcement details of toe and stem with curtailment of reinforcements.   **04**

Q 6   **a)**   Explain the conditions under which following types of foundations are provided.   **06**

(1) Isolated

(2) Combined

(3) Pile

(4) Raft.

b)   The layout plan of a square shape building shown in figure. Design a raft foundation for the building. Working loads acting on each column is 500 kN. Take net bearing capacity = 100 kN/m^3.   **10**
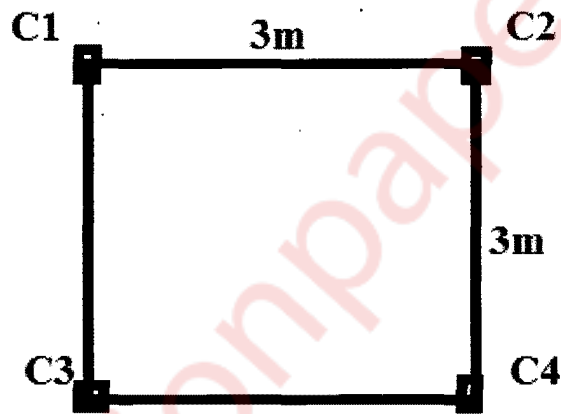
Draw a neat sketch showing reinforcement details   **04**

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