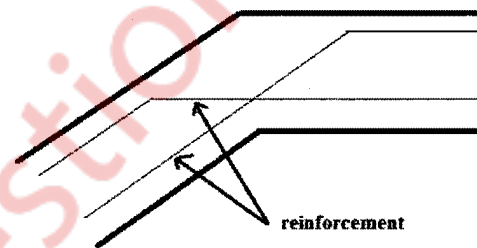


1. Question No 1 is **Compulsory**.
2. Attempt any **three** questions out of remaining questions.
3. Use of **IS CODES** is **permitted**.
4. **Assume** suitable data if required and **state** it clearly.
5. All sketches must be drawn on **drawing sheet**.

**Q 1**

Attempt following questions.

- |  |           |
|--|-----------|
| a. Explain different types of reinforcing steel used in beam, column, two way slab and isolated footing with neat sketches | <b>05</b> |
| b. Write a short note on design of staging for a overhead water tank   | <b>06</b> |
| c. Explain any three general guidelines to be considered while planning a staircase.                                       | <b>05</b> |
| d. Explain the reason for scissor joint in staircase reinforcement.  | <b>04</b> |

**Q 2**

Following figure shows the framing plan of a residential building. Floor to floor height is 3.2 m. Grade of concrete is M 20 and steel is Fe 415. All columns are 300mm × 300mm in size

TURN OVER

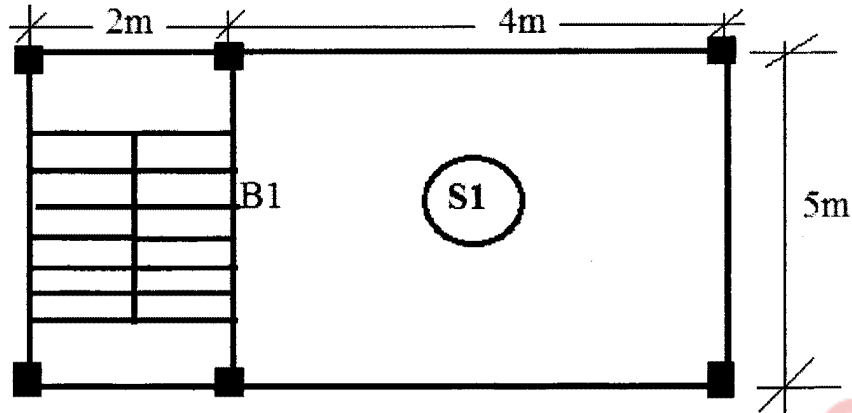


Figure 1

- |    |  |    |
|----|--|----|
| a) | Design the slab S1                         | 08 |
| b) | Draw the reinforcement details of slab S1  | 02 |
| c) | Design beam B1                             | 08 |
| d) | Draw the reinforcement details of beam B1. | 02 |

Beam B1 is provided with 8mm diameter stirrups @150 mm c/c throughout the length.

- |            |    |  |    |
|------------|----|--|----|
| <b>Q 3</b> | a) | A building having floor to floor height as 4 m is to be provided doglegged staircase. Grade of concrete is M 20 and steel is Fe 415. Design the staircase.   | 14 |
|            |    | Draw the plan showing flight details   | 03 |
|            |    | Draw Reinforcement details in a flight   | 03 |
| <b>Q 4</b> |    | Design by approximate method a rectangular tank 4 m × 4.5 m in plan and 4 in height. Tank is resting on firm ground. Grade of concrete is M25 and steel is Fe 415. check the design for safe stresses. | 16 |
|            |    | Design the following   |    |
|            |    | a) Side walls  |    |
|            |    | b) Base slab   |    |
|            |    | Draw neat sketches showing the reinforcement details   | 04 |

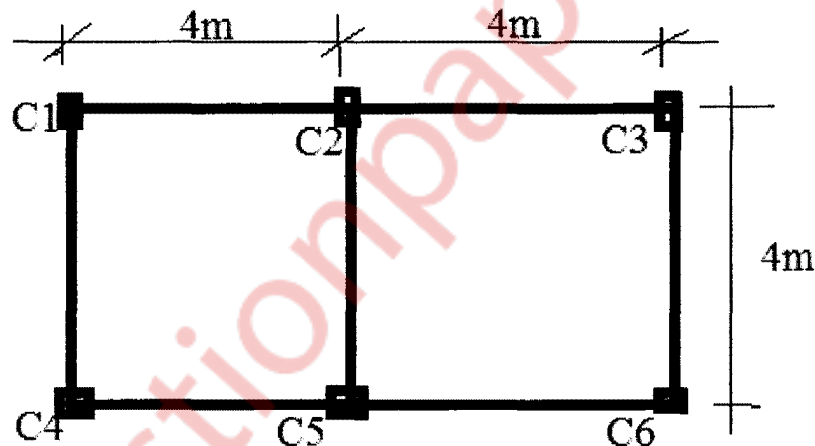
TURN OVER

**Q 5** A reinforced concrete cantilever retaining wall is supporting a backfill of height 4.8 m above ground. Take density of soil =  $18 \text{ kN/m}^3$ . Angle of repose =  $30^\circ$ . SBC of soil =  $150 \text{ kN/m}^3$  and coefficient of friction between concrete and soil = 0.40. Grade of concrete is M20 and steel is Fe 415.

- a) Design the retaining wall and show all stability checks. **16**
- b) Draw reinforcement details of toe and stem with curtailment of reinforcements. **04**

**Q 6** a) Following figure shows the layout plan of the columns of a building. Design a raft foundation for the building. Take net bearing capacity =  $80 \text{ kN/m}^3$ . Each Corner column carries a load of 700 kN. Central columns carry load of 1000kN.

Draw a neat sketch showing reinforcement details **03**



**Figure 2**

- b) Suggest types of foundations (with neat sketches) that can be provided for following conditions. **05**
- (1) Foundation of column close to boundary
  - (2) Multistoried building on low bearing capacity soil.