



OR

- 6 A T-Beam and slab floor system has a slab 125mm thick spanning between T-Beams. Which are spaced at 3.5m apart. The beams have a clear span of 8m and end bearings are 300mm walls. The live load on the floor is  $4\text{kN/m}^2$  and floor finish is  $0.6\text{kN/m}^2$ . Take overall depth of the beam equal to 600mm and web width to 300mm. Take self weight of the slab and web as  $13.90\text{kN/m}$  provide 20mm diameter main bars and 8mm diameter two legged stirrups. Use M20 concrete and Fe415 steel. Design the intermediate T-Beam for flexure and shear only. (20 Marks)

Module-4

- 7 Design an RC slab for room measuring  $4\text{m} \times 5\text{m}$  is inside. The slab carries a live load of  $2\text{kN/m}^2$  and is finished with 20mm topping of unit weight  $24\text{kN/m}^3$ . The slab is simply supported on all four edges with corners free to lift. No need to check for shear. Use M20 concrete and Fe415 steel. (20 Marks)

OR

- 8 Design a dog legged stair for an office building in a room measuring  $2.8\text{m} \times 5.8\text{m}$ , clear vertical distance between the floors is 3.6m. The width of flight is to be 1.25m. Assume imposed load of  $3\text{kN/m}^2$ . Use M20 concrete and Fe415 grade steel. Assume that the stairs are supported on 230mm width support at the outer edges of landing slabs. Sketch the reinforcement details. Design of one flight is enough. (20 Marks)

Module-5

- 9 a. A reinforced concrete column of 2.75m unsupported length carries an axial load of 1600kN. Design a square column using M20 concrete and Fe415 steel. Assume both ends of the column as hinged. (10 Marks)
- b. Determine the reinforcement required for a short column for the following data :  
Columns size :  $300\text{mm} \times 600\text{mm}$ ,  $P_u = 1800\text{kN}$  ;  $M_{ux} = 110\text{kN-m}$  with respect to major axis. Use M25 concrete and Fe415 steel. Sketch reinforcement details. Assume 50mm effective cover. (10 Marks)

OR

- 10 A square footing has to transfer a load of 1000kN from a square column of  $400\text{mm} \times 400\text{mm}$ . Assume M20 concrete and Fe415 steel, and SBC of soil  $200\text{kN/m}^2$ . Design the footing and sketch reinforcement details. (20 Marks)

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