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Total No. of Pages : 02

Total No. of Questions : 10

B. Arch. (2012 & Onwards) (Sem.-4)

STRUCTURE DESIGN – III

Subject Code : BACH-409

M.Code : 71024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt five questions with one question from each UNIT.
2. Missing data, if any may be assumed suitably.
3. Use of IS – 456-2000 is allowed.

UNIT-I

1. a) Name the checks we need to apply while designing an RCC beam. Write down the Codal provisions regarding the control of deflection. 4
b) Design an RCC beam simply supported over 200mm thick walls 6.0 m apart centre to centre subjected to a factored load of 22.5 kN/m. Use M-25 concrete and Fe 415 steel. 8
2. Design a RCC beam 230×600 mm (with effective cover to reinforcement is 50mm) over an effective span of 5m. The beam is subjected to an imposed load of 50 kN/m. Find the reinforcement required. Use M-20 concrete and Fe 415 steel. Take $f_{sc} = 353$ N/mm². 12

UNIT-II

3. a) Explain the difference between one-way and two-way slab. 5
b) Explain the procedure of designing one-way slab as per IS 456:2000. 7
4. Design an RCC slab of size 4m \times 6m supported on beams of 300mm breadth (with corners held down). The slab is subjected to an imposed load of 3kN/m² and floor finish of 1.0 kN/m². 12

UNIT-III

5. Design a dog-legged staircase for an office building in a room size measuring 3.0m \times 6.0m (clear) with floor to floor height 3.5m. The building is liable to an imposed load of 3.0 kN/m². Stair are supported on brick walls 230mm thick at the end of landings. Use M-20 concrete and Fe-415 steel. 12
6. Describe various components of staircase, viz. Risers, Treads, Width of step etc. and the values usually adopted for the design of staircase. 12

UNIT-IV

7. a) Differentiate between long and short columns. 3
- b) Design a rectangular RCC column of size 450×600 mm to carry an Axial Load of 2000 kN using lateral ties. The column is 3.0 m long with both of its ends hinged. Use M-20 concrete and Fe-415 steel. 9
8. Design a circular column of 400 mm diameter to carry an axial load of 1500 kN (factored) using helical reinforcement. The column is 3m long and is effectively held in position at both ends. Use M-25 concrete and Fe-415 steel. 12

UNIT-V

9. a) Name various types of column footings used in case of RCC columns. 5
- b) Discuss one way and two-way (punching) shear failures in isolated footings. 7
10. Determine the size and depth required for a square footing of uniform thickness for an axially loaded column of 350×350 mm size. The safe bearing capacity of soil is 170 kN/m^2 . Load on the column is 600 kN. Use M-20 concrete and Fe-415 steel. 12

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.