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09ENG55

Fifth Semester B.Arch. Degree Examination, July/August 2021
Structures – V

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer any FIVE full questions.
2. Use of IS456 – 2000 and SP16 is permitted.
3. Missing data may be suitably assumed.*

- 1 a. What is meant by workability of concrete? Explain any one method of determining workability of concrete. (08 Marks)
b. Discuss the different types, sizes and grades of reinforced steel used in RCC. (06 Marks)
c. Explain the objectives of concrete mix design. List the parameters, which influence the mix design. (06 Marks)
- 2 a. What are the assumptions made in working stress method? (04 Marks)
b. Explain balanced, under reinforced and over reinforced sections in analysis of RCC. (06 Marks)
c. A singly reinforced concrete beam with an effective span of 4 m has a rectangular section with a width of 250 mm and an overall depth of 550 mm. The beam is reinforced with 3 bars of 10 mm diameter Fe415 HYSD bars at an effective depth of 500 mm. The self weight of beam together with the dead load is 4 kN/m. Calculate the maximum permissible live load on beam. Assume M20 grade concrete. (10 Marks)
- 3 a. Define shrinkage. What are the factors influencing shrinkage? (08 Marks)
b. List the advantages and disadvantages of Reinforced cement concrete. (06 Marks)
c. Explain water cement ratio and how it affects the strength of concrete. (06 Marks)
- 4 a. Differentiate between 'ONEWAY' and 'TWO WAY' slabs. (04 Marks)
b. Design a RC slab for a hall 4m × 16m supported on masonry wall 230mm thick. I.L = 2.5 kN/m². Floor finish is 1kN/m². M20 concrete and Fe415 steel adopt limit state method. (16 Marks)
- 5 Design the necessary reinforcement for a RC beam 300 × 450mm to carry a udl of 25kN/m over a span of 4m. The beam is supported on a 400mm thick wall at the ends. Use M20 concrete and Fe415 steel. Adopt limit state method. Assume $f'_c = 40$ mm. (20 Marks)
- 6 Design the necessary reinforcement for a RC column 300mm × 400mm subjected to an axial design load of 1600 kN. Use M20 concrete and Fe415steel. Adopt limit state method sketch the c/s. (20 Marks)
- 7 Design a R.C footing for column 400 × 400mm to carry an axial load of 1600kN. Use M20 concrete and Fe 415 steel. SBC of soil is 220 kN/m². Sketch the details Adopt Limit state method. (20 Marks)
- 8 Explain the following with respect to design of stairs as per IS 456 – 2000.
a. Rise and Tread (02 Marks)
b. Waist slab (02 Marks)
c. Effective span (08 Marks)
d. Distribution of loading on stairs. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.