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Fifth Semester B.Arch. Degree Examination, Dec.2019/Jan.2020
Structures – V

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions.
2. Use of IS456 & SP-16 is permitted.
3. Any missing data may be assumed suitably

- 1
 - a. Explain the importance of W/C ratio. (06 Marks)
 - b. Define Workability. What are the factors affecting workability? (07 Marks)
 - c. List the advantages and disadvantages of R.C.C over other materials. (07 Marks)

- 2
 - a. State assumptions made in working stress method of design of reinforced concrete. (04 Marks)
 - b. Explain the necessity of doubly reinforced beams. (04 Marks)
 - c. The cross section of a singly reinforced concrete beam is 300 mm wide and 400 mm deep to the centre of the reinforcement which consists of 3 bars of 12 mm dia. If the stresses in concrete and steel are not to exceed 7 N/mm^2 and 230 N/mm^2 . Determine the moment of resistance of the section. Take $m = 13.33$. (12 Marks)

- 3
 - a. Explain the philosophy of limit state method of design. (06 Marks)
 - b. Determine the factored moment of resistance of a beam section $230\text{mm} \times 460\text{mm}$ effective depth reinforced with 2-16mm diameter bars as compression reinforced at an effective cover of 40mm and 4-20mm diameter bars as tension reinforcement. The materials are M-20 grade concrete and Fe – 415 steel. (14 Marks)

- 4 Design a one-way slab with a clear span of 3.5 m simply supported on 200 mm thick concrete masonry walls to support a live load of 4 kN/m^2 . Adopt M-20 grade concrete and Fe415 HYSD bars. (20 Marks)

- 5 Design a one way slab of clear span $3.0\text{m} \times 8.0\text{m}$ supported on beams 350mm thick to carry live load of 2kN/m^2 and floor finish of 1kN/m^2 . Use M-20 and Fe-415. Draw neat sketches. (20 Marks)

- 6 A square column 500×500 mm carries an axial load of 1500 kN. Design the column and a square footing for the column. The safe bearing capacity of the soil is 225 kN/m^2 . Use M20 and Fe415. (20 Marks)

- 7 Design an R.C. footing for a column $400\text{mm} \times 400\text{mm}$ to carry an axial load of 1600 kN. Use M₂₀ concrete and Fe415 steel. Bearing capacity of soil is 220 kN/m^2 . Sketch the reinforcement details. (20 Marks)

- 8 The dimensions of a stair case hall is $2.40\text{m} \times 4.75\text{m}$. The floor to floor height is 3520mm. Design an intermediate flight of a dog-legged stair using M₂₀ concrete and Fe415 steel. Take L.L = 3kN/m^2 . Assume that the landings span in the same direction as the stair and are supported on 300mm thick brick masonry walls. Sketch the details of reinforcement. (20 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.