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09ENG5.5

Fifth Semester B.Arch. Degree Examination, Dec.2018/Jan.2019
Structures – V

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer FIVE full questions.
2. Use of IS456 and SP-16 is permitted.

- 1 a. List the advantages of RCC. (10 Marks)
- b. Write a note on workability and water cement ratio importance in concrete. (10 Marks)
- 2 a. List the assumptions made in Limit State Method. (05 Marks)
- b. A reinforced concrete beam section of size (300×700) mm, effective depth is reinforced with 3 bars of 20 mm diameter in tension. Determine the moment of resistance and the stresses induced in the materials i.e. concrete and steel M20 concrete and Fe415 steel are used. (15 Marks)
- 3 a. Explain principles of limit state method. (06 Marks)
- b. Explain with neat sketch; Balanced, under reinforced and over-reinforced section in RCC. (06 Marks)
- c. Determine the minimum effective depth required and the corresponding area of tension reinforcement for a rectangular beam having a width of 200 mm to resist an ultimate moment of 200 kNm using M20 concrete and Fe415 steel. (08 Marks)
- 4 Design a singly reinforced concrete beam of width 300 mm, clear span 4 m. Consider LL of 5 kN/m. Use M20 concrete and Fe415 steel. (20 Marks)
- 5 Design a two way slab for a room of size (4×5)m with discontinuous and simply supported edges on all the sides with corners prevented from lifting to support a LL of 4 kN/m². Adopt M20 concrete and Fe415 steel. (20 Marks)
- 6 An RCC column of size (350×350) mm reinforced with 8 numbers of 16 mm diameter bars carries a characteristic load of 800 kN. The allowable bearing pressure on soil is 200 kN/m². Design an isolated square footing. The materials used are M20 concrete and Fe415 steel. (20 Marks)
- 7 a. Write a note on minimum eccentricity and slenderness ratio. (04 Marks)
- b. Differentiate between short and long column. (06 Marks)
- c. A column of size (400×500) mm carries a factored axial load of 3000 kN. The column is short and having a minimum eccentricity $e_{min} < 0.05D$. Design the column. M30 concrete and Fe415 steel is used. (10 Marks)
- 8 Design a dog legged staircase having the following details:
 Type of staircase: Dog legged with waist slab.
 No. of steps in the flight = 10
 Tread (T) = 300 mm
 Rise (R) = 150 mm
 Width of landing beam = 300 mm
 M20 concrete and Fe415 steel.
 Draw neat sketch. (20 Marks)

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.