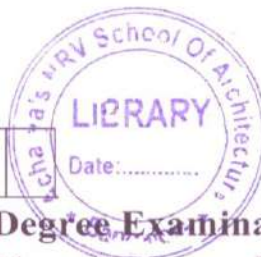


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09ENG5.5

Fifth Semester B.Arch. Degree Examination, Dec.2015/Jan.2016
Structures – V

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer any FIVE full questions.**
2. Use of IS 456:2000 and SP-16 is permitted.
3. Use Limit state method unless specified.

- 1
 - a. Explain balanced, under reinforced and over reinforced sections with neat sketches. (06 Marks)
 - b. Find the moment of resistance of a singly reinforced beam section 225 mm wide and 350 mm deep to the centre of the tensile reinforcement. If the permissible stresses in concrete and steel are 7 N/mm² and 230 N/mm² respectively. The reinforcement consists of 4 bars of 20 mm dia. What max. udl this beam can carry safely on a span of 8 m? Take $m = 13.33$. (14 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/mm² and 230 N/mm². Determine the moment of resistance of the section. Take $m = 13.33$. (12 Marks)
- 3

Design a singly reinforced concrete beam to suit the following data:
 Data : Clear span = 4 m, Width of supports = 300 mm, Service load = 5 kN/m, Materials : M20 and Fe415. (20 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/m². Adopt M-20 grade concrete and Fe415 HYSD bars. (20 Marks)
- 5
 - a. Explain minimum eccentricity and slenderness ratio. (05 Marks)
 - b. Design the reinforcements in a rectangular column of size 300 × 500mm to support a design ultimate load of 500 kN together with a factored moment of 200 kNm. Adopt the value of $f_{ck} = 20 \text{ N/mm}^2$ and $F_y = 415 \text{ N/mm}^2$. (15 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/m². Use M20 and Fe415. (20 Marks)
- 7

Design one of the flights of a dog-legged stairs spanning between landing beams using following Data: Type of staircase : Doglegged with Waist slab, treads and risers.
 Number of steps in the flight = 10
 Tread = T = 300 mm, Riser = R = 150 mm.
 Width of landing beams = 300 mm
 Materials : M-20 concrete and Fe-415 steel. (20 Marks)
- 8

Write short notes on:

 - a. Advantages of RCC.
 - b. Water cement ratio.
 - c. Grades of concrete and steel.
 - d. Stress strain block diagram for singly reinforced beam. (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.