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09ENG5.5

Fifth Semester B. Arch Degree Examination, June/July 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. State assumptions made in working stress method of design of reinforced concrete. (05 Marks)
 b. A singly reinforced beam is 250mm wide and 450mm deep to the centre of the tensile reinforcement with 4 bars of 18mm diameter. Determine the moment of Resistance using working stress method. The grade of concrete is M₂₀ and grade of steel is Fe 250. Draw the cross section of beam showing the bars. (15 Marks)
- 2 a. Explain why under reinforced sections are preferred in RCC design. (04 Marks)
 b. The cross-section of a singly-reinforced concrete beam is 300mm wide and 400mm deep to the centre of the reinforcement which consists of 3bars of 12mm diameter. If the stresses in concrete and steel are not to exceed 7N/mm² and 230N/mm². Determine the moment of resistance of the section. What max. udl this beam can carry safely on a span of 6m? Take m = 13.33 (Use WSM) (16 Marks)
- 3 A doubly reinforced beam section is 250mm wide and 450mm deep to the centre of tensile reinforcement. It is reinforced with 2 bars of 16mm diameter as compression reinforcement at an effective cover of 50mm and 4 bars of 25mm diameter as tensile steel. Using M₂₀ concrete and Fe250 steel, calculate the ultimate moment of resistance of the beam section. (20 Marks)
- 4 A T – beam of flange width 1200mm, flange thickness 100mm, rib width 275mm has an effective depth of 550mm and is reinforced with 6 bars of 25mm diameter and 4 bars of 16mm diameter. Find the ultimate moment of resistance. Use M₂₀ concrete and Fe415 steel. (20 Marks)
- 5 Design a singly reinforced concrete beam to suit the following data.
 Data: clear span = 4m, width of supports = 300mm, service load = 5kN/m.
 materials – M₂₀ and Fe415 (20 Marks)
- 6 Design a two way slab for an office floor of size 3.5m × 4.5m with discontinuous and simply supported edges on all the sides with corners prevented from lifting and supporting a service live load of 4kN/m². Adopt M₂₀ grade concrete and Fe415 HYSD bars. (20 Marks)
- 7 a. Define effective length of column. (05 Marks)
 b. Design the reinforcements in a rectangular column of size 300×500mm to support a design ultimate load of 500kN together with a factored moment of 200kN.m. Adopt the value of f_{ck} = 20N/mm² and f_y = 415N/mm². Use SP-16 chart. (15 Marks)
- 8 Write short notes on (any four)
 a. Objectives of concrete mix design
 b. Distinguish between singly reinforced and doubly reinforced sections.
 c. Differentiate between working stresses and limit state method of design.
 d. Grades of concrete and steel
 e. Workability of concrete. (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.