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10CV52

Fifth Semester B.E. Degree Examination, May 2017
Design of RCC Structural Elements

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting atleast TWO questions from each part.*
2. Use of IS 456 and SP – 16 are permitted.

PART – A

1 a. Discuss the significance of characteristic strength and characteristic loads in RC design. **(06 Marks)**

b. Find the moment of resistance of a rectangular beam of size 200mm width and 400 mm effective depth for the following reinforcements.
i) 3 – 16mm dia bars ii) 4 – 16mm dia bars.
Resize the beam if necessary use Fe415 grade steel and M20 grade concrete. **(14 Marks)**

2 a. List the circumstance under which doubly reinforced beam are recommended. **(04 Marks)**

b. A simply supported beam 300 mm wide and 600 mm depth (effective) carries 74 kN/m including self weight of beam over a span of 6 m (effective). The flexural reinforcement consists of 5 bars of 25mm out of which 2 are cranked at support with an inclination of 45°. Design shear reinforcement for beam. use M20 grade concrete and Fe 415 grade steel. **(16 Marks)**

3 A T – beam floor slab consists of beams spaced at 3.2m c/c. Thickness of slab = 120mm. LL on slab is 4.6 kN/m^2. The beam has a clear span of 7m wall support is of thickness 300mm. Design an intermediate T –beam for flexure and shear. Sketch reinforcement detail at mid span and support. **(20 Marks)**

4 a. List the factors influencing deflection of RC beam. **(04 Marks)**

b. A simply supported beam of rectangular section 250 mm × 450mm (overall) is used to carry a service load of 10 kN/m over on effective span of 4m. Self weight of beam together with DL on beam is 4 kN/m. The beam is reinforced with 3 bars of 20 mm dia at an effective depth of 400 mm. Find the short term deflection at mid span. Use M20 grade concrete and Fe415 grade steel. **(16 Marks)**

PART – B

5 a. Distinguish between one way and two way slab. **(04 Marks)**

b. A simply supported slab (all edges discontinuous) on a room of inner size 4m × 6m. The slab carries LL of 3 kN/m^2 besides finishing load of 0.9 kN/m^2. Thickness of wall around the room = 230mm. Corners of the slab are held down. Design the slab and sketch reinforcement details. **(16 Marks)**

6 a. What are the codal guide lines for determining longitudinal and lateral reinforcements in column? **(06 Marks)**

b. A column of size 300mm × 450mm is subjected to factor load and factored uniaxial moment of magnitude 1000 kN and 200 kN respectively uniaxial moment acts about major axis. Using M20 concrete and Fe415 grade steel design the column. Take effective cover(d') all round the column = 45 mm. Sketch reinforcement details. **(14 Marks)**

7 A rectangular column 450mm × 600m carries an axial load of 1200 kN. Design a rectangular footing using M20 concrete and Fe415 grade steel. Take SBC of soil = 200 kN/m^2. Sketch details of reinforcement. **(20 Marks)**

8 A stair room for a public building is 3m × 5m. Dog legged stair is to be provided for a floor height of 3.6m. Design the layout geometry of stair. Design any one of the flight. Use M20 concrete and Fe415 grade steel. Sketch layout details and reinforcement details in flight. Take LL = 3 kN/m^2. **(20 Marks)**

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