Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50287

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fifth Semester

Civil Engineering

CE 6505 – DESIGN OF REINFORCED CONCRETE ELEMENTS

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Use of IS 456 is Permitted.

Adopt grade of concrete M25 and Fe415 steel wherever required.

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. Draw stress strain diagrams for a beam for elastic method, Ultimate Load method and Limit State method (LSD).

2. What are the philosophy of limit state method ?

3. What are the minimum and maximum reinforcement for a beam in LSD ?

4. Distinguish between the behavior of one way slab and two way slab.

5. Determine the anchorage length for 20mm diameter bar.

6. What is torsional shear ?

7. What is the need of minimum eccentricity clause for a column design ?

8. What is meant by braced column ?

9. What are forces to be considered while designing the footing ?

10. When do you prefer combined footing ?

PART – B (5×13=65 Marks)

11. a) Design a simply supported reinforced concrete beam to carry a bending moment of 50 kNm as doubly reinforced section by working stress design. Keep the width is equal to half the effective depth. **(13)**

(OR)

b) Design a simply supported rectangular slab for a hall of size 4 m × 5 m to carry a UDL of 5 kN/m^2. **(13)**

12. a) Calculate ultimate moment of resistance of the beam of size 300 mm × 500 mm provided with tensile reinforcement of 9000 mm^2 and compression reinforcement of 3000 mm^2. Take the effective cover at top and bottom is 40 mm. **(13)**

(OR)

b) Design the reinforcement for a T-beam for the following data : **(13)**

Effective span : 8m

Spacing of beams = 3m, Thickness of slab = 130 mm

Total depth = 450 mm, Live load = 10kN/m^2

13. a) Design the shear reinforcement for a beam 150 mm × 300 mm effective depth subjected to 15 kN/m. the span of the beam is 5 m. Take tensile reinforcement at a section is 1.2%. **(13)**

(OR)

b) Design the reinforcement required for the section 300 mm × 500 mm for the following data :

Bending moment = 65 kNm, Torsional moment = 40 kNm, Shear force = 70 kN. **(13)**

14. a) Design a short column to carry an axial load of 1200 kN and moment of 60 kNm about the major axis. The effective height of column is 3 m. **(13)**

(OR)

b) Design the reinforcement for a column of size 250 mm × 300 mm if it is subjected Pu = 500 kN, Mux = 50 kNm and Muy = 30 kNm. Provide effective cover of 50 mm. **(13)**

15. a) Design a rectangular footing for a column 400 mm × 400 mm to transfer an axial load of 1000 kN. The safe bearing capacity of soil is 150 kN/m^2. **(13)**

(OR)

b) Design a combined footing for two columns 300 mm × 300 mm, 4m apart to transfer an axial load of 1500 kN each. The width is restricted to 2.5 m. The safe bearing capacity of soil is 200 kN/m^2. **(13)**

PART – C (1×15=15 Marks)

16. a) Explain in detail about the following methods of design.

i) Elastic method

ii) Ultimate load method

iii) Unit State Method.

Also explain their merits and demerits.

(OR)

b) Design a footing to carry a strip load of 100 kN/m transferred by a wall of width 0.5 m. Safe bearing capacity of the soil is 150 kN/m^2.

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