D 30956 (Pages : 2) Name.....

Reg. No.....



# FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION OCTOBER 2012

Civil Engineering

CE 09 502—STRUCTURAL DESIGN–I

(2009 Scheme)

Time : Three Hours Maximum : 70 Mark

## Part A

*Answer* **all** *questions.*

1. Define characteristic strength of materials.
2. Define partial safety factors.
3. Differentiate one way and two way slabs.
4. Define stairs.
5. Define slenderness ratio.

(5 × 2 = 10 marks)

## Part B

*Answer any* **four** *questions.*

1. Write short notes on durability of concrete structures.
2. Define 'Limit State' and mention its types.
3. Explain the shear strength of the sections and its importances.
4. Explain in brief the moment-redistribution for continuous beam analysis.
5. Define the following :
   (a) Waist slab.
   (b) Stringer beams.
6. Define 'eccentricity' and mention its effects.

(4 × 5 = 20 marks)

## Part C

1. Derive the formula for moment of resistance for a singly reinforced sections.

*Or*

2. How will you check the sections for deflection as per Code, with details and formulas ?
3. Find the effective depth and area of tensile steel for a singly reinforced RC rectangular beam subjected to a B.M. of 100 kNm. The width of the beam is 300 mm. Use M-20 and Fe-415 materials.

*Or*

4. Write a detailed procedure for shear design for the sections.

**Turn over**

5. Design a T-beam section of 1500 mm width of flange, 100 mm depth of flange, 300 mm width of web and 500 effective depth is subjected to BM of 500 kNm. Use M-20 and Fe-415 materials.

*Or*

6. A room of a guesthouse measures 6 m × 5 m clear between walls. Design the roof slab using concrete M-20 and steel Fe-415 for an imposed load of 1.5 $kN/m^2$ and load due to weathering course of 1.8 $kN/m^2$. The edges of the slab are simply supported and corners are not held down. Thickness of supporting walls is 200 mm.

7. A RC column 400 mm × 400 mm is reinforced with 4 numbers 25 mm longitudinal bars. Use M-15 and Fe-415 were used. Length of column is 3 m effectively held in position at both ends, restrained against rotation at one end. Find the strength of column.

*Or*

8. (a) List out general specifications of stairs.

   (b) Write short notes on reinforced concrete tension members.

(4 × 10 = 40 marks)