

B. Tech Degree V Semester Examination, November 2009

CE 503 A/B DESIGN OF STRUCTURES I (1999 Scheme)

Time : 3 Hours

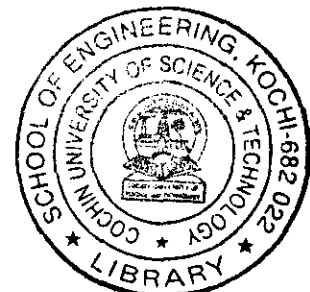
Maximum Marks : 100

(Use of IS 456, IS 800, SP – 6, SP – 16, SP – 34 are allowed.
Assume any missing data)

- I. (a) Compare the merits and limitations of Limit State Design and Working Stress Design. (8)
(b) Design a doubly reinforced rectangular beam section to carry a uniformly distributed load of 50 kN/m over a span of 6.5 m, simply supported on walls of thickness 250 mm, using working stress method. Restrict the beam depth to 400 mm. Use M 20 mix and Fe 250 grade steel. (12)
- OR**
- II. (a) Describe the classification of flexural members as under reinforced, balanced and over reinforced. (6)
(b) Differentiate between
(i) Factor of safety and Load factor
(ii) Partial safety factor and Limit states (4)
(c) Design a circular column using working stress method to carry an axial compression of 50.0 kN. The effective length of column is 6.0 m. Use M 25 grade concrete and Fe 250 grade steel. (10)
- III. Design a T beam for the following data using Limit State Design to resist a factored moment of 650 kNm :
- | | |
|-----------------|-------------------------|
| Width of flange | - 1500 mm |
| Depth of flange | - 150 mm |
| Effective depth | - 700 mm |
| Web thickness | - 300 mm |
| Fek | - 20 N/mm ² |
| Fy | - 415 N/mm ² |
- Show the reinforcement details with neat sketches. (20)
- OR**
- IV. (a) What are the major differences in the design of a T beam and L beam? (5)
(b) Derive the stress block parameters and expressions for moment of resistance of rectangular beam by limit state design. (7)
(c) Write down the steps involved the calculation of moment of resistance of a doubly reinforced rectangular beam using limit state design. (8)
- V. (a) Explain the different types of shear reinforcement. (5)
(b) Explain the factors contributing to shear resistance of flexural members. (5)
(c) Explain the calculation and provision of longitudinal and transverse reinforcement for members subjected to torsion combined with flexure and shear. (10)

OR

(Turn Over)



- VI. Design by limit state method, the section of a beam 450 mm wide and 750 mm deep subjected to a bending moment of 120 kNm, twisting moment of 10 kNm and shear force 100 kN. Use M 20 mix concrete and Fe 415 grade steel. (20)
- VII. Design a suitable staircase for a building where staircase hall measure 3.5 m x 4.5 m. The height between floors is 3.6 m. Take live load as 4 kN/m². (20)
- OR**
- VIII. Design using limit state method a two way slab over a room 5.0 m x 5.0 m. The slab has bearing of 200 mm all around on the walls. The corners of the slab are held down. Liveload on the slab is 3 kN/m². Use M 20 mix concrete and Fe 415 grade steel. (20)
- IX. Write short notes on any four of the following :
- (i) Flexural bond stress
 - (ii) Anchorage length
 - (iii) Curtailment of tensile reinforcement
 - (iv) Serviceability conditions of limit state
 - (v) Anchorage bond stress
 - (vi) Development length
 - (vii) Pull out test.
- (5 x 4 = 20)
