B.Tech. 6th Semester (Civil Engg.) F. Scheme
Examination, May–2012

DESIGN OF CONCRETE STRUCTURE-II

Paper-CE-302-F

Time allowed : 3 hours]   [Maximum marks :100

*Note :Attempt **five** questions in all. **Question No. 1 is** **compulsory** and solve **one** question from each Section. Use of IS code 456-2000, 3370 Vol I to Vol-IV are permitted. Draw neat diagrams and drawings with designs. All questions carry equal marks. Assume suitable data if missing and wheresoever necessary.*

1. State whether the following statements are true or false:

    (a) The column supporting circular beam and symmetrically placed will give horizontal and vertical reactions.

    (b) In curved circular beams, there is no shear force and bending moment at supports.

    (c) Column strip means a design strip having width as $0.25 \, l_2$ but greater than $0.25 \, l_1$ on each side of column centre line.

24378-P-4-Q-9 (12)   [P.T.O.]

(d) Absolute sum of positive and average negative bending moment in each direction shall be $\dfrac{Wl^2}{8}$.

(e) The nominal reinforcement for concrete section thickness greater that 1 shall be $260mm^2$/length in each direction in each case.

(f) Design of water retaining structures has same procedure as an ordinary RCC structural design.

(g) Special concrete anchors induce compression in post-tensioning prestressed concrete.

(h) The crackline shrinks with increase in deflection till the slab is broken. 8×2.5=20

Section - A

2. (a) What do you understand by Modification of Moments?

   (b) Calculate the maximum bending moment for a semicircular beam supported on 3 equally spaced columns; the centre of columns are on a curve of 10^{meter} diameter. The superimposed load is 1500 kg/m^2. 8+12=20

3. (a) What are the methods of design of flat slabs as per ISI code?

24378

(b) Design an interior panel of size $6^m \times 6^m$ of a flat slab floor system on 460 mm square columns with square head of 1m size. The flour system supports an imposed service load of 6.5 kN/m². Use M25 grade concrete and Fe 415 grade steel.

8+12=20

Section-B

4. Design a combined footing for two columns $500^{mm} \times 500^{mm}$ each, 5 meter apart carrying 1600 kN load. Available width restriction is 2.4 meters. The safe bearing capacity is 200 kN/m². Use M25 grade concrete and Fe 415 grade steel. 20

5. Design an underground reservoir $12^m \times 4^m \times 4^m$ size as per IS code. The angle of repose of soil is 30° and density of soil is 1600 kg/m². The soil is saturated. Use M20 grade concrete and Fe 415 grade steel. 20

Section-C

6. (a) What do you understand by substitute frame? Explain.

(b) Which method would you recommend for analysis of a building from @ Moment Distribution Method or Slope Deflection Method? Which of these methods is advantageous? 8+12=20

7. (a) List the various stages to be considered in the design of prestressed concrete members. 6

(b) Explain the design of 'End Block' of a prestressed member by any one method. 7

(c) Explain various losses in Prestressing and give brief account, thereof, in percentage form. 7

Section-D

8. (a) State the assumptions made in yield line theory.

(b) What do you understand by Isotropically and orthotropically reinforced slabs?

(c) How will you analyse one way slab by equilibrium method? 6+7+7=20

9. (a) What is the concept of yield line theory?

(b) A triangular slab is simply supported along $PQ = 6m$; $QR = 4^m$ and free along PR, the third edge. The horizontal and vertical reinforcements at the bottom of slabs provide ultimate moment capacities as 60 kN.m/m. Determine yield line pattern and the uniformly distributed collapse load. 4+16=20

24378