(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 100505
100515

Roll No. | | | | | | | | | | |

B. Tech.

(SEM. V) THEORY EXAMINATION, 2015-16

DESIGN OF CONCRETE STRUCTURES - I

[Time:3 hours] **[Maximum Marks:100]**

Section - A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2x10=20)

   (a) What is modular ratio ? Determine the modular ratio atr M2O grade concrete.

   (b) Define characteristics strength.

   (c) Define limit state of servieability.

   (d) Define factor of safety and load factor.

   (e) What do you mean by flexural shear cracks ?

   (f) Enumerate types of shear reinforcement with neat sketch.

   (g) Define one way slab and two way slab.

   (h) Explain main steeel and distribution steel in slab.

   (i) Enumerate different types of column.

   (j) Explain the codal provisions used in compression members with helical reinforcement.

Section - B

Note : Attempt **any five** questions from this section: (10x5=50)

2. The moment of resistance of rectangular reinforced concrete beam of breadth 'b' and effective depth 'd' cm is "0.9b.d". If the stress in the outside fibre of concrete and in the steel do not exced 5 N/mm² and 140 N/mm² respectively. And the modular ratio equals 18, determine the ratio of depth of the neutral axis from the outside compression fibre to the effective depth of the beam and the ratio of area of tension steel to the effective area of the beam. The beam is reinforced for tension only.

3. Design a reinforced concrete beam subjected to a B.M. of 20 KN-m. Use M20 concrete Fe 415 reinforcement. Keep the width of the beam equal to half the effective depth.

What are the assumptions for the design of reinforce concrete section for limit state of collapse in bending ? Derive the stress blck parameters for a rectangular cross section.

5. Design a rectangular beam for an effective span 6m. The superimposed load or live load 80 KN/m and the size is limited to 300 mm width and 700 mm overall depth. Use M20 concrete mix and Fe 415 steel.

6. A.R.C. beam has an effective depth of 400 mmand breadth of 300 mm. It contains 3-25 mm Fe 500 grade bars in tension. Determine the shear reinforcement needed for a factored S.F. of 250 KN if M30 mix is used.

7. Design a one way slab, with a clear span of 4.0 m. simply supported on 230 mm thick masonary walls and subjected to a loive load of 4 kN/m² and a surface finish of 1 kN/m². Assume M15 mix and Fe 415 grade steel.

8. Design a short axially loaded square column 500 x 500 mm for a working load of 2000 kN. Use M20 concrete and Fe 415 grade steel.

9. Design a circular column to carry an axial load of 1000 kN. Use M20 mix and Fe 415 grade steel

Section C

Note : Attempt **any two** questions from this section: (15x2=30)

10. Design the Torsional Reinforcement in a rectangular bbeam section. 350 mm wide and 750 mm deep, subjected to an ultimate twisting moment of 140 KNm, combined with an ultimate BM of 200 KNm and an ultimate SF of 110 KN. Assume M25 concrete and Fe415 grade of steel.

11. Design a SS slab to cover a room of internal dimensions of 4m x 6m & 230 mm thick brick walls all around. It carries live load of 3 KN/m² and floor finidh of 1 KN/ m². Use M20 concrete and Fe 415 steel. Consider that the slab corners are prevented from lifting.

12. A T-beam floor consists of 150 mm thick R-C slab monolithic with 300 mm wide beams. The beams are spaced at 3.5m center to center and their effective span is 6m. If the superimposed loads on the salb is 5 KN/m². Design an intermediate T-beam. Use M20 mix and Fe 250 grade steel.

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