29681

Name : .....

Reg. No: .....

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, OCTOBER 2012

CE 09 701 – STRUCTURAL DESIGN – III
(2009 Admission)

Time : Three Hours **Maximum : 70 Marks**

PART – A

Answer all questions.

1. Differentiate between short and slender column.
2. Draw the schematic diagram of a pile cap.
3. List out different types of retaining wall.
4. Explain the principles of prestressing.
5. What is the use of a stiffner in a plate girder.

(5 x 2 = 10 Marks)

PART – B

Answer any four questions.

6. Explain the steps involved in the design of a isolated footing.
7. Explain the elements of a retaining wall.
8. What are the different system of prestressing?
9. Explain the structural configuration of a railway bridge.
10. Briefly explain different types of pile foundation.
11. Explain IRC loading on a bridge.

(4 x 5 = 20 Marks)

PART – C

Answer all questions. Assume any data missing suitably.

12. Design a footing for a 400 x 400 mm column to carry a load of 1000 kN with foundation resting on soil with safe bearing capacity of 120 kN/m^2. Assume M20 concrete and Fe 415 steel.

(Or)

13. Design the reinforcement for a column with lex = ley = 4m and size 300 x 300 mm subjected to a factored axial load of 1000 kN with biaxial moments of 100 kNm and 80 kNm with respect to major and minor axis respectively. Assume M20 concrete and Fe415 steel.

19. Design a RC slab bridge for the following data:
Clear span = 4m; width of support = 500 mm; Live load = IRC class A loading; carriage way width = 7.5m; Thickness of wearing coat = 80 mm. Use M20 concrete and Fe415 steel.

(Or)

15. Design a cantilever retaining wall for the following data:- Height of wall above the ground = 4 m; Density of earth = 18 kN/m^3 ; angle of internal friction = 30^0, Safe bearing capacity of soil = 200 kN/m^2 ; co-efficient of friction at base between soil and concrete = 0.6 Back fill is horizontal. Use M25 concrete and Fe415 steel.

19. A rectangular beam of cross section 400 mm depth and 230mm wide is prestressed by 10 numbers of 6 mm diameter wires whose centroid is located at 50mm from the bottom of beam and 2 numbers of 6mm diameter wires located at 30mm from top. Assuming the effective prestressing in steel as 1000 N/mm^2. If a uniformly distributed live load of 10 kN/m is imposed and the modulus of rupture of concrete is 7N/mm^2 . Obtain the maximum tensile stress in concrete at service and estimate the load factor.

(Or)

Turn over

17. A pretensioned beam 230mm x 500mm deep is prestressed by 9 wires of 6 mm dia initially stressed to 1000 N/mm^2 with their controid located at 50mm from the soffet. Find the maximum stress in concrete immediately after transfer allowing only for elastic shortening of concrete If the concrete undergoes a further shortening of crop and shrinkage while there is relaxation of 4% steel stress. Estimate the initial percentage loss of stress in the wires using the following data. Fek = 50N/mm^2, residual shrinkage strain = 3×10^{-4}.

18. A plate girder of 10m effective span supports concentrated loads of 100 kN at 3m intervals. Design a suitable section at a distance of 3m from the support and intermediate stiffness. Use power driven rivets.

(Or)

19. A plate girder has an effective span of 20 m and is simply supported at its ends. It carries a u.d.l of 100 kN/m exclusive of its self weight. Design the girder at midspan. Also draw neat sketch of the structure.

(4 x 10 = 40 Marks)

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