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Roll No ....

CE - 803

B.E. VIII Semester
Examination, June, 2013
Advanced Structure Design - II (Steel)

Time : Three Hours

Maximum Marks : 100   **Minimum Pass Marks :35**

Note: i) Each question carry equal marks.

ii) Assume suitable data wherever necessary.

iii) Use of IS codes and steel table is permitted.

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1. a) Design a deck type welded steel plate girder bridge to suit the following data -   20

Effective span of bridge - 30m

Dead load (open floor) - 7.5Kn/m.

Equivalent total live load for bending moment calculation per track - 2727Kn.

Equivalent total live load for bending shear calculation per track - 2927Kn.

Top of rail level - 108.00m

Side slope of embankment - 15:1

Foundation level = 100.50m

Width of abutment-

Design the main plate girder with intermediate and bearing stiffeners.

OR

2. a) What is the importance of influence lines in bridge design? Explain.   7

b) Derive the expression for economic span length of bridge.
7

c) Explain different types of bridges with neat sketch. 6

3. A pratt truss girder through bridge is provided for single broad gauge track. The effective span of bridge is 50m. The cross girders are spaced 5m apart. The stringers are spaced 2m between center line. 650N/m stock rails and 500N/m guard rails are provided. Sleepers are spaced at 0.40m from center to center and are of size 2.8m×250mm×250mm. Weight of timber may be assumed as 7.8Kn per cubic meter. The main girder are provided at spacing of 7m between their center lines. Design the central top chord member and vertical member.
20

OR

4. Analyze a two lane bridge girder for class A loading with deck bridge arrangement given- 20

Span - 25m

Roadway-7.5m

Footpath-1.5m each side.

Spacing of girder - 6.5m

Spacing of cross beam - 2.0m

Type of girder - N type trusses

Only maximum bending moment and shear force values for the girder are required to be calculated.

5. Design an elevated rectangular tank having a capacity of 1,25,000 liters. The tank is open at the top. The height of staging is 12m upto the top of the column. Sketch the details.
20

OR

6. Design the container of a circular hemispherical bottom water tank for capacity of 1,75,000 liters. Sketch the detail. 20

7. Design for Delhi a self supporting steel stack of height 60m above the foundation and diameter of cylindrical part 4.25m. Foundation is raft resting on medium soil having bearing capacity $250KN/m^2$. Assume that 150mm thick lining is supported by the stack through out the height. Design only the chimney shell.
20

OR

8. a) Write the difference between self supporting and guyed chimney.
10

b) Write a short note on wind load calculation for chimney.
10

9. Design a coal bunker to hold 35 metric tone coal. Unit weight of coal is $12Kn/m^3$ and angle of internal friction is $30°$. Sketch the detail.
20

OR

10. A 60m high microwave antenna lattice tower is to be built near Agra where the terrain of the site is nearly a level ground with terrain of category 2. The diameter of hemispherical antenna disc fixed at the top is 2.5m. The width of the tower on the top is 3.0m. Select a suitable configuration for the tower and determine maximum compressive and tension force in the tower legs for the following data-

Weight of antenna disc and fixtures - 9.5Kn

Weight of platform at top- $0.85Kn/m^2$

Weight of railing at top- $0.35Kn/m^2$

Weight of ladder and the cage - $0.7Kn/m^2$

Weight of miscellaneous items- 2.5Kn
20