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Roll No .....

CE-803

B.E. VIII Semester

Examination, June 2017

Advanced Structure Design-II (Steel)

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) Use of relevant code of design is allowed.
iii) Use grade of steel Fe-410.

1. The effective span of a deck type plate girder two lane highway bridge is 30m. The reinforced concrete slab is 250mm thick inclusive of the wearing coat. The footpath are provided on either side of the carriage way. Design the maximum section of plate girder, if the girder is to carry IRC class A loading. 14

2. Pratt truss girder through bridge is provided for single broad gauge track. The effective span of bridge is 50m. The cross girder are spaced 5m apart. The stringers are spaced 2m between centre lines. 0.60kN per meter stock rails and 0.40kN per meter check rails are provided. Sleepers are spaced at 0.45m from centre to centre and are of size 2.8m × .25m × .25m. Weight of timber may be assumed as 7.50kN per cubic meter. The main girders are provided at a spacing of 7m between their centre lines. Design the central top chord member and bottom chord member of the truss. The bridge is to carry standard main line loading. 14

3. Design for Indore, a self-supporting steel stack of height 60m. The diameter of cylindrical shell is 4.25 metres. Foundation is raft resting on medium soil. Assume that 100 mm thick lining is supported by the stack throughout the stack. 14

4. Design an elevated steel tank circular in shape for 100000 litre capacity with circular girder supported on suitable number of columns. The shape of bottom may be assumed suitably. The roof coverings and staging for the tank need not be designed. 14

5. An elevated rectangular steel water tank open at top is required to have a capacity of 70,000 litre with a free board of not less than 150 mm. The bottom of tank is 10m above ground level. Using 1.25m × 1.25m standard pressed steel plates design the tank. 14

6. Design a bunker for the given dimensions: the length is 18m with four supporting columns on each side to that the spacing of columns is 6m; the width is 9m and the height is 6m for the vertical portion and 6m for the hopper. The material stored is pulverized compacted coal powder of bulk density 890 kg/m^3; angle of internal friction ϕ is 25°. 14

7. A silo with internal diameter 5.5m, height of cylindrical portion 18m and central opening with 0.5 m is to be built to store wheat. Design the silo using M 20 grade concrete and Fe 415 steel. Given : 14
   i) Unit wt. of wheat = 8.5 kN/m^3.
   ii) Angle of internal friction = 28°

8. Define the following (any two) : 14
   i) End bearings for steel bridges
   ii) Type of trusses
   iii) Lining material used for chimneys
   iv) Analysis of towers

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