

Roll No

CE - 803**B.E. VIII Semester**

Examination, June 2014

Advanced Structure Design - II (Steel)**Time : Three Hours****Maximum Marks : 70**

Note: i) Attempt all questions. There is internal choice between questions.

ii) Assume suitable data, if found missing.

iii) Use of relevant IS code is permitted.

1. What are the various types of plate girder bridges? Discuss elements of Half Through type plate Girder Bridge with sketch. 14

Or

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2. Design a deck type plate girder railway bridge for single track B.G. loading for the following data:

Effective span = 24 m

Spacing of plate girder = 1.9 m c/c

Weight of stock rails = 440 N/m

Weight of guard rails = 260 N/m

Weight of fastenings etc = 280 N/m of track

Timber sleepers = 250 mm × 150 mm × 2.8 m @ 0.4 m c/c

Density of timber = 7.4 KN/m³

Take permissible stresses as per railway steel bridge code. 14

3. What are the various types of truss girders? Sketch them. Discuss wind effect on truss girder bridges. 14

Or

4. Design a rocker bearing for a bridge using following data:
Vertical load due to DL+LL+impact = 950 KN

Vertical load due to wind at each end of girder = 200 KN

Lateral load due to wind at each bearing = 60 KN

Longitudinal load per girder = 300 KN

Permissible stresses on M.S. pin are 100 MPa in shear, 208 MPa in bearing and 208 MPa in bending.

Permissible bending stress for base plate is 185 MPa and safe bearing pressure on concrete is 4000 KN/m. 14

5. Design an elevated cylindrical steel tank with hemispherical bottom for 160000 litres capacity. The tank has conical roof. The ring beam of the tank is at a height of 10m from the ground level. The tank is to be built at Delhi. Take $f_y = 250 \text{ N/mm}^2$. 14

Or

6. What are different types of prestressed steel tank? Discuss all type and sketch any one with detail. 14

7. Design for Delhi a self-supporting steel stack of height 60 m above the foundation and diameter of cylindrical part is 4.25 m. Foundation is raft resting on medium soil. Assume 100 mm thick lining is supported by the stack throughout the height. 14

Or

8. Mention various forces acting on a steel stack? How these forces (stresses) are calculated in a chimney? 14

9. Design a rectangular bunker of 12 m length and 6 m width supported on 8 columns to store coal of bulk density 8.00 KN/m³ and an angle of internal friction 35°. Height of vertical portion is 4m and height of hopper is 4m. 14

Or

10. Design a circular silo of 12 m height and 4 m internal diameter to store cement of bulk density 15.5.5 KN/m³ and an angle of internal friction 25°. 14