

CE-803(N)

B. E. (Eighth Semester) EXAMINATION, June, 2011

(Civil Engg. Branch)

ADVANCED STRUCTURAL DESIGN-II (STEEL) [CE-803(N)]

Time : Three Hours Maximum Marks : 100 Minimum Pass Marks : 35

Note : Attempt only four questions. Use of IS Code, design aids and steel table is permitted.
Any missing data may be assumed suitably and mention clearly. All questions carry equal marks.

1. Design the control section of deck- type plate girder bridge for single track B. G. main line loading for the following data :

- | | |
|-------------------------------|--|
| (i) Eff span | - 24 m |
| (ii) Spacing of plate girder | - 1 • 9 m c/c |
| (iii) Weight of stock rails | - 440 N/m |
| (iv) Weight of guard rails | - 260 N/m |
| (v) Weight of fastenings etc. | - 280 N/m of track |
| (vi) Timber sleepers | - 250 mm x 150 mm
x 2 - 8 m @ 0 - 4 m c / c |
| (vii) Density of timber | - 7.4 kN/m ³ |

Take permissible stress as per railway steel bridge code.

Or

2. Design stringer with bracing a through type truss girder bridge to carry a single track B. G. loading for the following data :

- | | |
|--|--|
| (i) Effective span | — 40 m |
| (ii) Centre to centre spacing
of stringer | — 1 - 9 m |
| (iii) Sleepers and their spacings | -250 mm
x 150mm x 2-8 m @ 0-4 m c/c |
| (iv) Density of timber | — 7.4 m kN/m ³ |
| (v) Wt. of stock rails | —0.44 kN/m |
| (vi) Wt. of guard rails | — 0-26 kN/m |
| (vii) Wt. of fastening etc. | —0-28 kN/m of track |

Take permissible stresses as per railway steel bridge code. Sketch the details.

3. Design a hemispherical bottom steel tank to store 90 KL water. Sketch the details.

Or

4. An elevated rectangular steel water tank; open at top is required to have a capacity of 90000 litres with a free board of not less than 15 cm. The bottom of the tank is at 10 m above ground level. Using (1-25 x 1-25) rri standard pressed steel plates and suitable allowable stresses. Design the tank and its supporting beams.

5. A self-supporting steel stack is of height 64 m above the foundation. The diameter of the cylindrical part of the chimney is 3-2 m. The foundation has to rest on medium soil having bearing capacity of 200 kN/m^2 . The thickness of fire brick lining is 100 mm and the lining is supported by the stack throughout the height. The chimney has one breech opening. The topography at the site is almost flat and the location is of terrain category 2 :

- (i) Compute wind pressures at salient levels.
- (ii) Design the chimney shell/plates.
- (iii) Sketch the details.

Or

6. Design for Bombay a self-supporting steel stack of height 7.0 m above the foundation and diameter of cylindrical part 4 m. Raft foundation is provided resting on a soil of bearing capacity 200 kN/m^2 . Assume that 120 mm thick lining is supported by stack throughout the height. Design the chimney shell and plates. Sketch the details.

7. Design a silo to hold 450 kN of wheat. Unit weight of wheat 8.5 kN/m^3 and $\phi = 25^\circ$. Sketch the details.

or

8. Design a bunker to store 400 kN of coal with the following data :

- (i) Unit weight of coal = 8400 N/m^3
- (ii) Angle of repose = 30°
- (iii) Sketch the details.