

**B.TECH. CIVIL ENGINEERING
(BTCLEVI)**

Term-End Examination

December, 2013

BICEE-009 : ADVANCED STEEL DESIGN

Time : 3 hours

Maximum Marks : 70

Note : Answer any four questions. Assume any missing data suitably. Use of scientific calculator and BIS codes are allowed.

1. Design a simply supported gantry girder to carry 17.5 one electric overhead travelling crane, with the following data :
Span of gantry girder = 6.5m
Span of crane girder = 16m
Crane capacity = 250 kN
Self weight of crane girder excluding trolley = 280 kN
Self weight of trolley = 50 kN
Minimum hook approach = 1.0m
Distance between wheels = 3.5m
Self weight of rails = 0.3 kN/m.
2. Design an elevated cylindrical steel tank with 17.5 hemispherical bottom for 1,60,000 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 $f_y=250 \text{ N/mm}^2$.

3. Design of self supporting steel stack of height 72m 17.5
above the foundation. The diameter of the cylindrical part of the chimney is 3m. The foundation has to rest on medium soil having bearing capacity of 200 kN/m^2 . The thickness of fire brick work lining is 100mm, 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.
4. Design a deck type plate girder railway bridge 17.5
for single track B.G. main line loading, for the following data:
Effective span = 24m
Spacing of plate girders = 1.9m c/c
Weight of stock rails = 440 N/m
Weight of guard rails = 260 N/m
weight of fastenings = 280 N/m of track
Timber sleepers =
250mm \times 150mm \times 2.8m @ 0.4m c/c
Density of timber = 7.4 kN/m^3 .
5. Design a single angle strut for a roof truss carrying 17.5
a compressive load of 100 kN. The length of strut between centre to centre intersection is 2m. Also design :
(a) riveted and
(b) welded end connections, and give neat sketches in either case.

6. A tension member consists of an ISA 17.5 $150 \times 115 \times 10$ mm. Determine the safe axial pull it can carry if
- (a) it is connected by sufficient number of 20 mm rivets at the end.
 - (b) if it is connected by suitable weld at each end.
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