

6E3034

Roll No. _____

Total No of Pages: **4****6E3034****B. Tech. VI Sem. (Main & Back) Exam. May/June-2014****Civil Engg.****6CE3 Steel Structures-II****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 24****Instructions to Candidates:-**

Attempt any four questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.

Units of quantities used/ calculated must be stated clearly.

Use LSM for units 1 and 2 and WSM for units 3 and 4.

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205)

- | | |
|--|---------------------|
| 1. I.S. 800 – 2007 | 2. I.S. 800 – 1984 |
| 3. ISI Hand Book for structural Engineers vol 3 (Steel Tables) | 4. I.S. 875 Part 3. |
| 5. Railway Bridge Rules | |

UNIT-I

- Q.1 (a) Determine the design wind pressure for a sloping roof of a shed to be used in Kota. The span of the roof is 12m and its pitch is $\frac{1}{4}$. The height of the eaves above the ground level is 10m. Assume normal permeability. [8]

(b) Design an I section purlin for dead load plus live load condition from following data-

- (i) Spacing of trusses c/c = 4.0 m
(ii) Spacing of purlins c/c = 1.7 m
(iii) Angle of pitch = 30°

The trusses carry G.I. sheets.

[12]

OR

Q.1 Design a gantry girder for an industrial building, to carry an E.O.T. crane, from following data- [20]

- (i) Crane capacity = 150 kN
(ii) Weight of crane excluding trolley = 100 kN
(iii) Weight of trolley = 40 kN
(iv) Span of crane = 12 m
(v) Span of gantry girders = 7 m
(vi) Minimum approach of hook = 1.0 m
(vii) Wheel base = 3.0 m

UNIT-II

Q.2 A plate girder, simply supported at the ends has effective span 16 m. It carries a superimposed load of 25 kN /m over the whole span. Assuming compression flange of the girder to be laterally supported, design the section at mid-span. Also design the welds connecting flange plates and web. Do not design stiffeners. [20]

OR

- (a) Briefly discuss splicing of web plate, with neat diagrams. [5]
- (b) A welded plate girder of 24m span carries u.d.l. of 40 kN/m including self weight, in addition to two point loads, each 150 kN applied at one-third points. The designed section of the girder consists of a web plate 1400 mm × 10 mm and flange plates of size 400mm X 30mm at top and at bottom. Design the intermediate transverse stiffeners and their connection to the web plate. [15]

UNIT-III

Q.3 (a) Draw a neat sketch of a through type plate girder Railway Bridge and label the components. [5]

(b) Determine the increase in stresses in the flanges of leeward girder due to overturning effect of wind when (i) bridge is unloaded and (ii) bridge is loaded, for a deck type plate girder railway bridge, B. G. , from following data- [15]

- | | | |
|--|---|--------|
| (i) Effective span of bridge | = | 25 m |
| (ii) Spacing of plate girders c/c | = | 2.0 m |
| (iii) Overall depth of the section of girder | = | 2.1 m |
| (iv) Height of rail section | = | 150 mm |
| (v) Height of sleepers | = | 150 mm |

OR

Q.3 An 'A' type portal bracing has been used in a through type truss girder bridge. It is subjected to a lateral horizontal force of 100 kN as shown in Fig 1. Analyse the frame completely. Also find the portal effect in the bottom chords of the truss girders, if the end posts are inclined at 50° to the horizontal. [20]

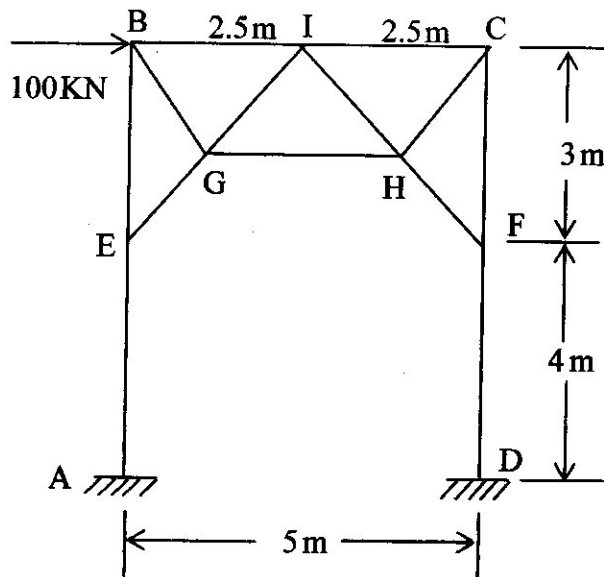


Fig1

UNIT-IV

Q.4 Design an overhead steel tank, circular in shape, with hemi spherical bottom for 1,60,000 liters capacity. The tank is supported on 6 columns placed uniformly along the periphery, for which $M = .01482 WR$, $T = .00151 WR$ and $F = W/12$. The columns and staging need not be designed. [20]

OR

Q.4 Design an elevated riveted steel rectangular tank with flat bottom for a capacity of 75,000 liters. The tank is resting on two tier of I section beams, which in turn rest on 6 no. of columns. Use 1.2 m wide plates. Do not design the columns and staging. [20]
