8E8092

8E8092

B.Tech. VIII Semester (Main/Back) Examination, April/May - 2017
Civil Engineering
8CE2A Design of Steel Structures-II
rtuonline.com

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. I.S. 800-2007
2. I.S. 875 - Part 3
3. Steel tables
4. Railway bridge rules

Unit - I

1. Design a gantry girder for an industrial building to carry on E.O.T. crane, from following data. **(16)**

i)	Crane capacity	= 170 kN
ii)	Weight of crane excluding trolley	= 120 kN
iii)	Weight of trolley	= 50 kN
iv)	Span of crane	= 12 m
v)	Span of gantry girders	= 7 m
vi)	Wheel base	= 3 m
vii)	Minimum approach of hook	= 1.1 m

OR

1. An industrial shed in kota measures 32 m × 16 m in plan. The height of the building at the eaves level is 14 m. The fink type trusses have been used with span 16 m and rise 4 m. The spacing of trusses being 4m. Compute the design wind pressure, assuming low permeability.

   Also calculate the value of dead, live and wind load acting on one purlin. The purlins are being placed at the nodes on principal rafters at four equal spacings.**(16)**

rtuonline.com

Unit - II

2. Design a simply supported welded plate girder of effective span 15 m if a superimposed load of 20 kN/m acts on the girder throughout the span. Its compression flange is laterally restrained against buckling. Stiffeners need not be designed. rtuonline.com **(16)**

OR

2. a) Discuss the functions of intermediate transverse stiffeners and bearing stiffeners in a plate girder. **(4)**

   b) A plate girder has 21 m span and carries a u.d.l. of 60 kN/m including self weight. Design a suitable web splice at a distance of 7 m from each support. The section consists of a web plate 1400 mm × 8 mm and two flange plates each 360 mm × 40 mm provided at top and bottom. **(12)**

Unit - III

3. Write short notes on :

   a) Top lateral bracing for deck type plate Girder railway bridges. **(8)**

   b) Use of internal gusset plates in through type plate girder railway bridges. **(8)**

OR

3. A deck type plate girder railway bridge for B.G. Main line, has following data. **(16)**

   i)   Effective span of the bridge   =   26 m

   ii) c/c spacing of plate girders   =   2.0 m

   iii) Overall depth of the section   =   2.2 m

   iv) Height of rail section   = 150 mm

   v)   Height of sleepers   = 150 mm

   Calculate the increase in stresses in the flanges of leeward girder due to overturning effect of wind when

   a) Bridge is unloaded   b) Bridge is loaded.

Unit - IV

4. Design a stringer beam in a through type truss girder railway bridge for B.G. Main line from following data : **(16)**

   i)   Effective span   =   30 m

   ii) c/c of stringers   =   2.0 m

   iii) c/c of cross beams   =   3.0 m

   iv) c/c of truss (main) girders   =   5.0 m

   v)   Weight of stock rails   =   460 N/m

vi) Weight of guard rails .... = 280 N/m

vii) Weight of fastenings per track .... = 300 N/m

viii) Sleepers size 250 mm × 120 mm × 2800mm

ix) Density of wooden sleepers .... = 10 kN/m³

4. An 'A' type portal bracing has been used in a through type truss girder railway bridge. It is subjected to a lateral horizontal force of 120 kN as shown in Fig. 1. Analyses the frame completely and state the assumptions made. **(16)**
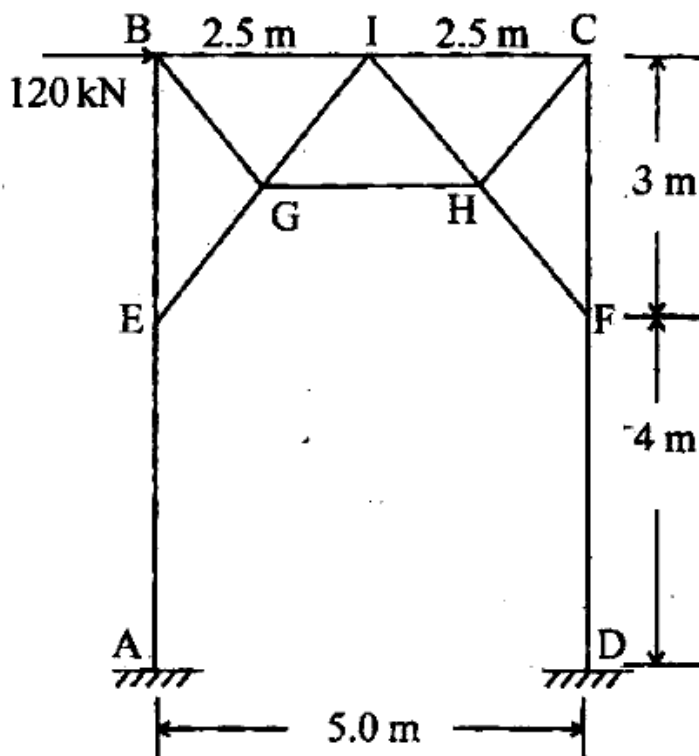

Fig. 1.

Unit - V

5. Design an overhead cylindrical steel tank with hemispherical bottom for 150 kiloliters capacity. The tank is supported on 6 no. of columns uniformly placed along the periphery, for which M = .01482 WR, T = .00151 WR, F = W/12 and α = 12° 44', where W is total vertical load, R the radius of circular girder and α is the angular distance from column to point of maximum torsion. **(16)**

OR

5. Design an elevated two tier rectangular pressed steel tank having capacity 120 kilo litres. Design the stays also and draw their arrangement. Show loads transferred to an intermediat top tier beam. Do not design the beam. **(16)**

❀ ❀ ❀