Total No. of Questions : 6]

SEAT No. :

P4600

[Total No. of Pages : 2

[4960]-42

M.E. (Civil - Structures)

STRUCTURAL DESIGN OF STEEL BRIDGES

(2008 Pattern)

Time : 4 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Attempt any two questions from Section I and Section II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figure to the right indicate full marks.***
5) ***Assume suitable data, if necessary and clearly state.***
6) ***Use of electronic pocket calculator, steel table and IS 800 are allowed.***
7) ***Use of cell phone is prohibited in the examination hall.***

SECTION - I

Q1) a) Explain in brief classification of bridges with sketches. **[10]**

b) Explain the historical development of bridges in details. **[8]**

c) State and explain lateral forces acting on bridges. **[7]**

Q2) a) Explain design criterion of horizontal truss bracings and end cross frames deck type plate girder bridge. **[10]**

b) A deck type plate girder railway bridge of span 24 m is provided for a double broad gauge track. The self weight of stock rails and check rails are 0.8 and 0.4 kN/m respectivly. The self weight of sleepers is 3.6 kN/m. Design a economical cross section of plate girder. Draws the design sketches for the bridge structures. The EUDL for B M is 2329 kN, for S F is 2548 kN and impact factor is 0.526. **[15]**

P.T.O.

Q3) a) Explain design criterion of bracing systems for through type truss girder railway bridges. **[10]**

b) Determine the maximum forces in top and bottom chord members of the pratt truss girder through bridge for single broad gauge track of span 50 m. The spacing of main girder, cross girder and stringer are 7, 5 and 2m respectively. **[15]**

SECTION - II

Q4) The effective span of through type truss girder highway two lane bridge is 30 m. The reinforced concrete slab is 250 mm thick exclusive of the wearing coat. The foot paths are provided on either side of the carriage way. The spacing between centre to centre of truss girder is 12 m. The highway bridge is to carry IRC class A standard loading. Suggest a suitable truss girder for the bridge. Design the top and bottom chord members of the central panel. **[25]**

Q5) The effective span of a deck type plate girder two lane highway bridge is 20 m. The reinforced concrete slab is 250 mm thick exclusive of the wearing coat, The foot paths are provided on either side of the carriage way. Design the maximum section of plate girder, if the bridge is to carry IRC class A loading. . **[25]**

Q6) a) Explain in brief application of bearing in railway steel bridges. **[10]**

b) The effective span of truss girder through type bridge for a single broad gauge track is 24 m. Reaction due to dead load, live load and impact load is 1000 kN. Vertical reaction due to wind is 150 kN. Tractive force is 1000 kN and breaking force is 500 kN. Design the rocker bearing and draw design sketch. **[15]**

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