24287

B. Tech 5th Sem. (Civil Engg.) Examination – December, 2014

DESIGN OF STEEL STRUCTURE-I

Paper : CE-301-F

Time : Three Hours]   [*Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. **1** is *compulsory.* All questions carry equal marks. Use of IS 800-1984 or 2007 is allowed. Use of Steel Table is allowed. Assume suitable data if missing.

1. Write short notes on the following :   2.5 × 8 = 20

   (a) Effect of Residual stresses
   (b) Shear failure
   (c) Why does 4 and 6 imply for bolts of grade 4.6 ?
   (d) Inelastic buckling
   (e) Fillet Weld
   (f) Function of anchor bolts

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(g) intermediate stiffeners

(h) Surge load and drag load on gantry girder

SECTION – A

2. (a) How ultimate strength, ductility and toughness can be determined from the stress- strain curve of mild steel ? 10

(b) Design a lap joint to connect two plates 300mm wide and 16mm thick using 20mm diameter high strength friction grip bolts. 10

3. (a) What are the factors that influence the strength of tension members ? 10

(b) Design a tension member to carry a pull of 600 kN. The member is 3.2m between c/c of intersections. 10

SECTION – B

4. (a) Differentiate between crippling load and buckling load. What are the basic assumption for Euler's theory ? 10

(b) Design a built-up column with four angles laced together. The effective length of the column is 7.20m and it supports a load of 1200, kN. 10

5. Design the section of steel column and a suitable base for an axial compressive force of 5000 kN. The effective length of the column is 5.5m. The safe bearing pressure from concrete may be assumed to be 4.75 N/mm^2. 20

SECTION – C

6. Design a fixed ended beam 5m span, if loaded with a uniform load of 24 kN/m on the left half span. Use the steel with yield stress of 250 Mpa. **20**

7. Design a gantry girder in an industrial building for two moving cranes for the following data : **20**

Crane capacity = 300kN

Weight of each crane = 170kN

Weight of each crab = 15kN

Minimum distance of crane hook = 1.3m

Min. distance between cranes = 3m

Wheel base = 3.3m

Bay width = 18m

Spacing of columns = 8m

Yield stess of steel = $250\ N/mm^2$

SECTION – D

8. Design a welded plate girder of span 35m. It is subjected to a uniformly distributed load of 38 kN/m. Design also the stiffeners and their connections. Use the steel with yield stree 250 Mpa. **20**

9. What are the steps involved in the design of plate girder ? Explain in detail. **20**

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