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43 (ARC-6) 6-5

2018

STRUCTURES-VI

Paper : ENG-6-5

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer **any five** questions.

1. (a) What are the advantages and disadvantages of steel members?
(b) What do you mean by structural steel section? Name a few and their uses.
10+10=20

2. (a) Explain the various failures of a riveted joint with diagrams.
(b) A double cover butt joint is used to connect plates 16mm thick. Design the riveted joint and determine its efficiency.
10+10=20

Contd.

3. (a) What are the assumptions taken for design of riveted joint?

(b) A single riveted lap joint is used to connect plate 10mm thick. If 20mm diameter rivets are used at 60mm gauge, determine the strength of joint and its efficiency.

Take —

Working stress in shear in rivets = $100N/mm^2$

Working stress in bearing in rivets = $300N/mm^2$

For plates, working stress in axial tension = $0.6f_y$; $f_y = 260N/mm^2$

10+10=20

4. (a) Define the term welding with a labelled diagram.

(b) Discuss various processes used for welding.

(c) Discuss in brief the different types of connections used for connecting structural members.

(d) Explain in brief the various types of welded joints with diagrams.

5×4=20

5. (a) List the advantages and disadvantages of welding.

(b) Design a suitable fillet weld to connect a tie-bar $60 \times 8mm$ to a 12mm thick gusset plate. The permissible stress in the tie bar and fillet weld are 150MPa and 108MPa respectively.

10+10=20

6. (a) Define tension member in brief. What are different types of tension members and their uses?

(b) Design a tension member consisting of a pair of angles (back to back) and connected by the short legs to the same side of a gusset plate. The member is to carry a pull of 250kN.

10+10=20

7. (a) A single angle strut ISA $50 \times 50 \times 6\text{mm}$ of a roof truss is 1.06m long. It is connected by one rivet at each end. Determine the safe load this strut can carry.

(b) Design a rolled steel beam section column to carry an axial load of 1100kN . The column is 4m long and adequately restrained in position but not in direction at both ends.

$$10+10=20$$