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Total Number of Pages : 02

Course: B.Tech  
Sub\_Code: RCI6C001

6<sup>th</sup> Semester Regular / Back Examination: 2022-23

SUBJECT: Design of Steel Structures

BRANCH(S): C&EE, CIVIL

Time : 3 Hour

Max Marks : 100

Q.Code : M497

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

(Use of relevant IS codes is permissible)

**Part-I**

Q1 Answer the following questions:

(2 x 10)

- Write various types of loads to be considered in design of steel structures.
- Define partial safety factor for loads.
- In class 4.6 bolts, what do the number 4 and 6 indicate?
- Define efficiency of a joint.
- State the different types of connections commonly used in steel design.
- What is effective diameter of a rivet?
- Define lateral torsional buckling.
- Define slenderness ratio of column.
- Distinguish between slab base and gusseted base.
- Where plate girders are used?

**Part-II**

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- State the advantages and disadvantages of steel structures.
- Explain the principle of limit state design of steel structures.
- Write the advantages and disadvantages of riveted connection
- Write the assumptions made in Welded connections.
- Explain the different types of failure of a tension member.
- State the type of steel cross section that can be used as tension members and their use in typical structures.
- The plates of a boiler are 10mm thick, connected by M16 bolts of grade 4.6 at a spacing of 50mm. If it is lap joint, determine the efficiency of the connection.
- Determine the design axial load capacity of the column ISHB 300@577N/m. If the length of the column is 3 m and its both ends pinned.
- What is the function of a column base? Explain briefly about different types of column base commonly used in practice with figure.
- State the design procedure of a steel beam.
- Differentiate between web bucking and web crippling of a beam.
- Illustrate the load combinations that are usually considered for truss analysis.

**Part-III**

**Only Long Answer Type Questions (Answer Any Two out of Four)**

- Q3** Two plates 180mm wide and 80mm thick are to be connected by welding, using shop welds. Design the connection. **(16)**
- Q4** Design a double angle tension member connected on each side of a 10mm thick gusset plate to carry an axial factored load of 350 kN. Use 20mm black bolts. Assume shop connection **(16)**
- Q5** Design a simply supported beam of effective span 2 m carrying a factored concentrated load of 400kN at mid span. **(16)**
- Q6** a) Explain various design components of a plate girder with sketches. **(8)**  
b) With neat sketch explain lacing and battening column systems. **(8)**