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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(CE) (2011 Onwards) (Sem.-5)
DESIGN OF STEEL STRUCTURES-I
Subject Code : BTCE-501
Paper ID : [A2078]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students has to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students has to attempt any **TWO** questions.

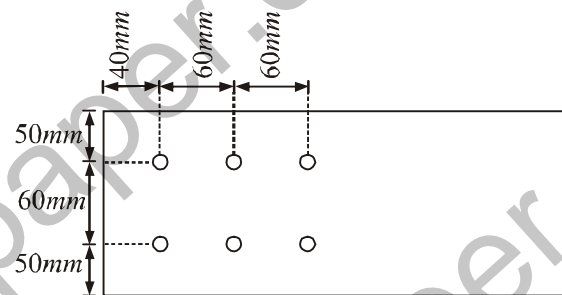
SECTION A

1. Write briefly :

- a) Why is steel considered superior for structural applications compared to the cast iron and wrought iron?
- b) What is ductility? Why is it important?
- c) What are the effects of residual stress in the design of compression members?
- d) What are the reasons for riveting to become obsolete?
- e) What is the difference between unstiffened and stiffened steel connection?
- f) Define efficiency of Joint.
- g) What is the Lap Joint? What is their main advantage? Which type of welds is used in Lap Joint?
- h) What is meant by web-crippling? When torsion does occur in a beam?
- i) State the difference between a Purlin and Girt. What are wind columns?
- j) What is the main purpose of Gantry girder? List the load that should be considered while designing a Gantry Girder.

SECTION-B

2. Explain the following terms :
 - a) Pitch of Bolt
 - b) Gauge distance
 - c) Edge distance
 - d) Staggered distance
 - e) Tacking Bolt
3. Determine the tensile strength of the plate $160\text{mm} \times 10\text{mm}$ with hole for 24mm Bolts as shown in Fig.



4. Design a gusseted base for a column ISHB350 @ 710 N/m with two plates $450\text{mm} \times 20\text{mm}$ carrying a factored load of 3600KN. The column is to be supported on concrete pedestal to be built with M20 concrete.
5. Explain with the neat sketch and nomenclature the different types of roof trusses.
6. Design a welded connection to connect two plates of width 200mm and thickness 10mm for 100 per- cent efficiency.

SECTION-C

7. a) What is a Lug angle? Illustrate with sketch. Why lug angles are used?
- b) Design a single angle section for a tension member of a roof truss to carry a factored tensile force of 225kn. The member is subjected to the possible reversal of stress due to the action of wind. The length of member is 3m. Use 20mm shop bolts of grade 4.6 for the connection.

8. Design a simple supported beam of 10m effective span carrying a total factored load of 60kN/m. the depth of beam should not exceed 550mm the compression flange of the beam is laterally supported by floor construction, assume stiffened bearing is 75mm?
9. Design an I-section Purlin for an industrial building to support a galvanized corrugated Iron sheet given:

Spacing of the trusses : 6m

Inclination of main rafter-30°

Spacing of Purlin =1.5m

Weight of purlin = 1.5m

Weight of corrugated sheeting -130M/m²

Live Load = 0.6 KN/m²

Wind Load =1.8 KN/m²

Yield stress of steel = 250MPa