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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (CE) (Sem.-7, 8)

**DESIGN OF STEEL STRUCTURES-II**

Subject Code : CE-408

Paper ID : [A0627]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

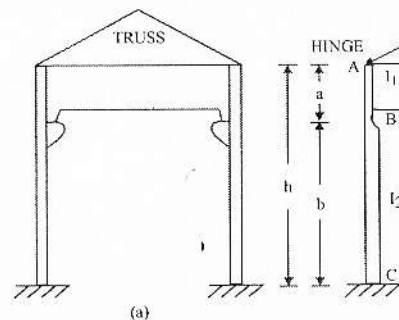
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

**SECTION-A****1. Write briefly :**

- (i) List the failure modes that may control the strength of bolted joint.
- (ii) What do you mean by partial penetration and full penetration groove weld? Which one is preferred and why?
- (iii) List the connections that can be used for resisting moment.
- (iv) List the loads that should be considered while designing a gantry girder.
- (v) What is column bracket? Why is it provided?
- (vi) What is the main purpose of the gantry girder?
- (vii) What is CDA?
- (viii) What is a cantilever bridge?
- (ix) What is portal sway bracing?
- (x) What is a foot bridge? What is the popular geometry of the foot bridge?

**SECTION-B**

2. The effective span of a plate girder deck railway bridge is 24 m. The dead load, live load and wind load are 10 kN/m, 15 kN/m and 1.5 kN/m respectively. The vertical reaction due to one of the girders is 115 kN. Design a suitable plate girder.
3. Describe the top lateral bracing and bottom chord bracing for a single type truss girder railway bridge.
4. In the industrial shed with the stepped roof, the height of the roof is given that  $a = 3.5$  m,  $b = 8$  m and  $h = 10$  m. The horizontal wind pressure of 5 kN/m acts on the windward wall. The height of the columns is 10 m and the crane reactions are 100 kN. The columns are acting at eccentricities of 300 mm from the center line. Determine the column moments.

**Fig. 1**

5. In a plate girder through bridge, carrying a single track, the cross-girders are spaced at 4 m centers. Design the stringers if the live load is 10 kN/m and the dead load is 2 kN/m. The stringers are spaced at 4 m centre to centre.
6. Determine the safe load  $P$  that can be applied at the free end of a cantilever beam of length 10 m. The beam is fixed at the other end. The beam is of I-section with a flange width of 200 mm and a web thickness of 10 mm. The flange thickness is 10 mm and the web height is 300 mm. The yield stress of the material is 250 MPa.

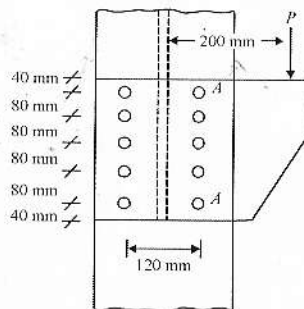


Fig. 2

## SECTION-C

7. Design a gantry girder for an industrial building carrying an electric overhead travelling crane, for the following data :
- |                                     |          |
|-------------------------------------|----------|
| Crane capacity                      | = 150 kN |
| Self weight of crab                 | = 50 kN  |
| Self weight of crane                | = 150 kN |
| Minimum approach of crane hook      | = 1.0 m  |
| Wheel base                          | = 3.0 m  |
| Distance between c/c of gantries    | = 20 m   |
| Distance between c/c gantry columns | = 4 m    |
| Crane type                          | = M.O.T  |
8. The span of knee roof truss used over an industrial building 32m long is 18 m. The spacing of roof trusses is 4 m. The pitch of roof truss is 1 in 4. The galvanized corrugated iron sheets are used for roof covering. The basic wind pressure is 1.5 kN/m<sup>2</sup> and there is no snow fall. The height of eaves above ground level is 8 m. Design the column supporting the roof truss for the industrial building. Assume normal permeability.
9. Write short notes on :
- The types of bolts
  - Concept of various forces in design of bridges