

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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 have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

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

- i) What are slotted holes and where are they used?
- ii) What are the various types of groove welds?
- iii) What are the two main types of moment resisting connections?
- iv) Write the classification of bridge according to the structural layout of the main carrying members.
- v) Write the Hudson's formula to estimate the dead load of the truss bridge.
- vi) List the two most common profiles of cross-sections which are used for gantry girder.
- vii) Differentiate between lateral load and longitudinal load on the gantry girder.
- viii) What are wind columns?
- ix) What is the function of bracing in the industrial buildings?
- x) What is a Foot Bridge? What is the value of live load generally used in the design of Foot Bridge?

## SECTION-B

2. A 120 mm diameter and 6 mm thick pipe is welded to a 14 mm plate by fillet weld. The pipe is subjected to a vertical load of 3 kN at 1.00 m from the welded end and a twisting moment of 1.2 kNm. Design the joint.
3. Determine the resultant stress on the worst affected bolt due to factored reaction of 50 kN to be transferred to the flange of column. The bolts used are 22 mm of grade 4.6 and steel Fe 410. (Fig. 1).

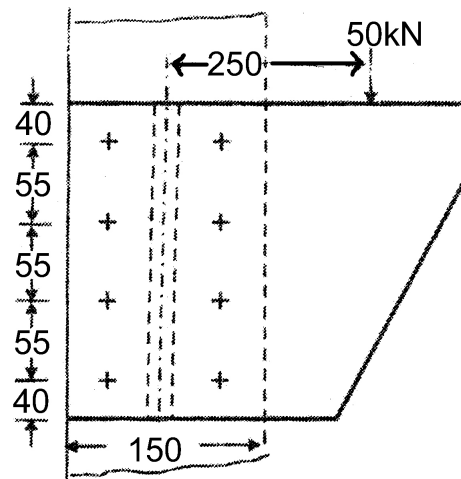


Fig.1

4. A plate girder single track main line broad gauge is of 24 m span between bearings. Design a suitable section for the plate girder and calculate the curtailment of flanges.
5. Write a short note about the framed connections and their design.
6. An A-type portal bracing of a truss girder is subjected to a horizontal reaction of 100 kN at the top, from left to right. The total length of portal bracing is 6.60 m. The knee braces have been connected at 2.80 m from the top. Determine the forces in the various members of the portal frame. Also determine the portal effect in the end post and in the bottom chords of the truss girder. The inclination of the end post with the horizontal is 45°.

## SECTION-C

7. Design a gantry girder for an industrial building carrying an electric overhead traveling crane, for the following data :

Crane capacity	= 300 KN
Self weight of crane girder excluding trolley	= 200 KN
Self weight of crane	= 150 KN
Minimum approach of crane hook	= 1.2 m
Distance between c/c of wheels	= 3.2 m
Distance between c/c of gantries	= 16 m
Span of gantry girder	= 4 m
Weight of rail	= 0.3 KN/m
Height of rails	= 75 mm
Yield stress of steel	= 250MPa

8. Design a purlin for an industrial building (Fig. 2) with following data :

Overall length	= 48 m
Overall width	= 16.5 m
Centre to centre distance of roof columns	= 16 m
Height of columns	= 11 m
Rise of the truss	= 4 m
Centre to centre distance of trusses	= 8 m

Roofing material and the side coverings are of Asbestos cement sheets having the dead load of  $171 \text{ N/m}^2$ . The building is situated in Allahabad. Assume that the life of building is 50 years and the land is plain and surrounded by small buildings.

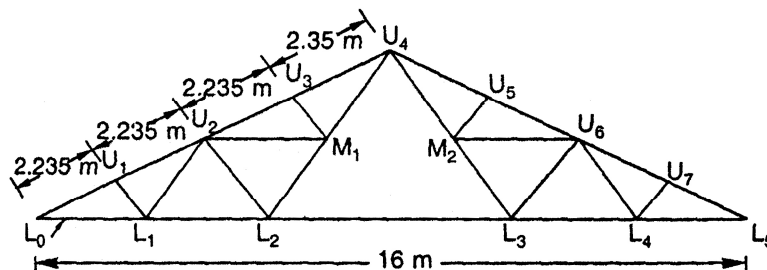


Fig.2

9. Write short notes on :
- Various modes of failure (behavior) of bolted connections with neat sketches.
  - Classification of bridges