

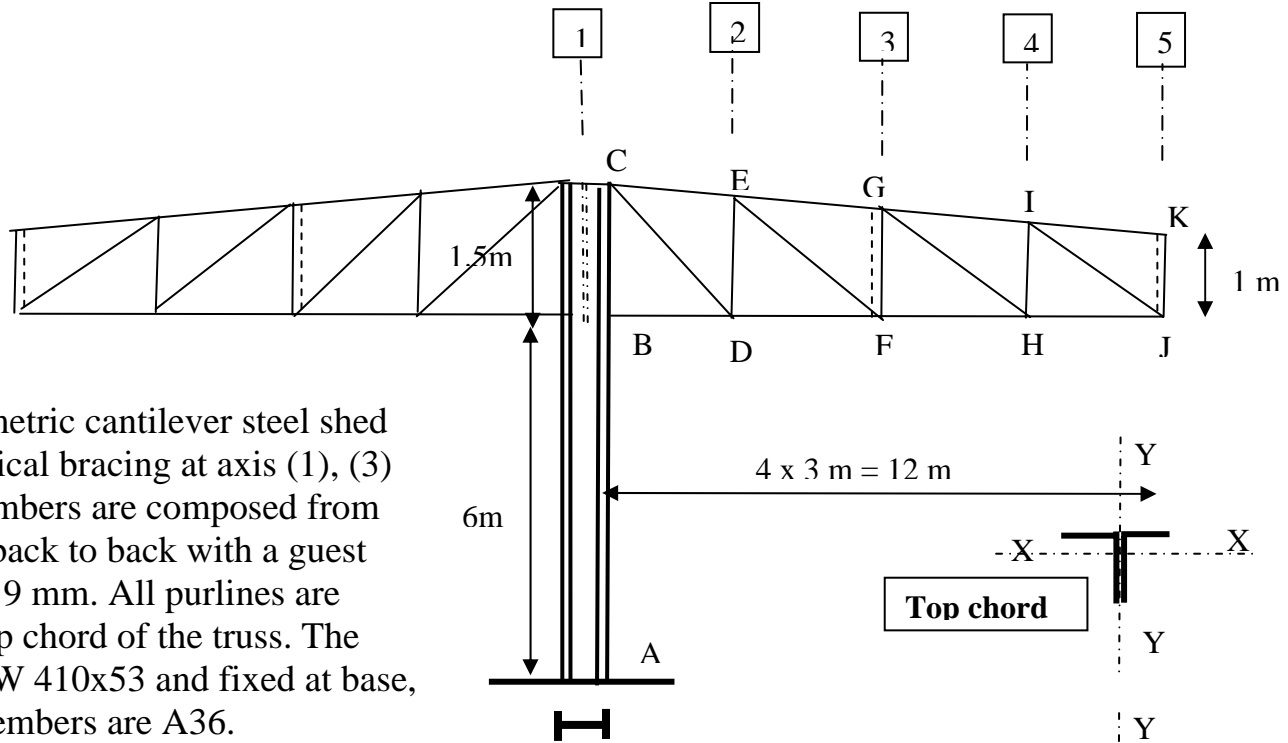
Name in Arabic :
Number:

Lecture time :

KING SAUD UNIVERSITY
COLLEGE OF ENGINEERING
CIVIL ENGINEERING DEPARTMENT

STEEL STRUCTURES: CE 473
SECOND SEMESTER, 1427/1428 H
TIME : 90 min

SECOND MID TERM EXAM



Problem 1:

The shown symmetric cantilever steel shed truss has a vertical bracing at axis (1), (3) and (5), all members are composed from double angles back to back with a gusset plate thickness 9 mm. All purlines are supported at top chord of the truss. The column AB is W 410x53 and fixed at base, and all steel members are A36.

1- What is the buckling length of member BD

	Choose the right answer		Value
	Buckling in Plane	Buckling outside the plane	
KL _x			
KL _y			

2- What is the buckling length of member CE

	Choose the right answer		Value
	Buckling in Plane	Buckling outside the plane	
KL _x			
KL _y			

3- What is the buckling length of Column AB

	Choose the right answer		Value
	Buckling in Plane	Buckling outside the plane	
KL _x			
KL _y			

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4- For member BD, $KL_x = 3.50$ m and $KL_y = 7.0$ m , and $P_u = 150$ kN, **use the LRFD Tables** to determine the **lightest double angle back to back section for the following two cases**, and its corresponding factored compression load

	Lightest section	Factored compression resistance
Lightest double equal angle back to back		
Lightest double unequal angle with short legs back to back		

5- For Column AB, W 410x53, A(36), determine its factored compression strength, if its $KL_x = 14$ m and $KL_y = 6$ m.

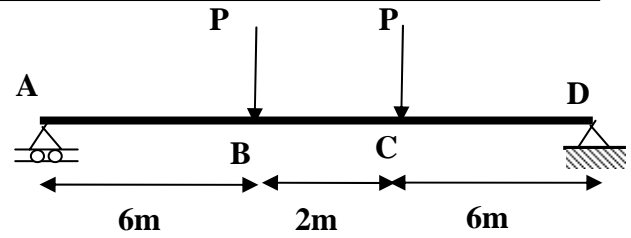
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Problem 2 :

For the shown simply supported beam, its top flange is Laterally supported by a R.C slab only between BC. Its Section is W 610 x 92, A36.



1- Determine the maximum ultimate Load (P) that the beam can support.

2- If the beam section is W 610 x 92, determine the maximum service live load (P) so that the maximum deflection does not exceed $L/360$, given that the maximum deflection = $P a (3 L^2 - 4 a^2) / (24 EI)$, where $a = 6m$ and $L = 14m$