Name in Arabic :	**Lecture time :**
Number:	

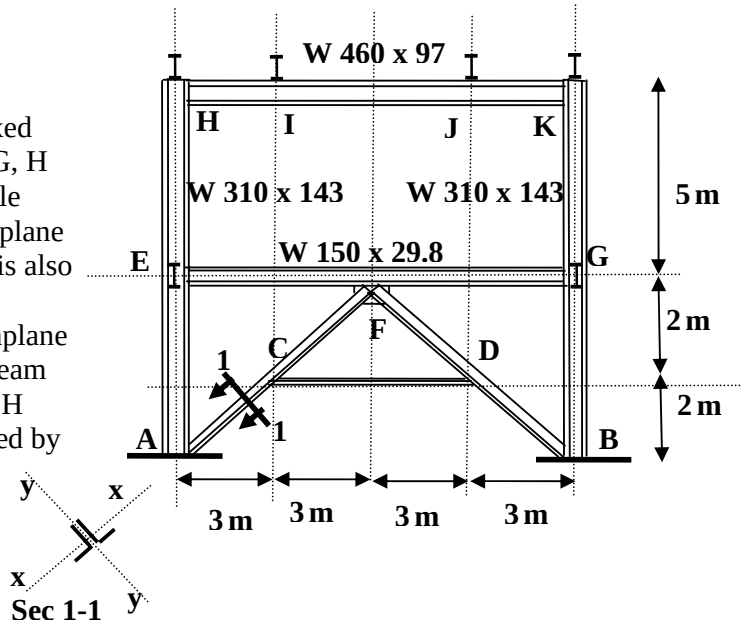
KING SAUD UNIVERSITY — **STEEL STRUCTURES : CE 473**
COLLEGE OF ENGINEERING — **SECOND SEMESTER, 1426/1427 H**
CIVIL ENGINEERING DEPARTMENT — **TIME : 90 min**

SECOND MID TERM EXAM

Answer all problems in the provided spaces

Problem 1:

The shown frame is made of steel A36, with fixed base at A and B, and laterally supportted at E, G, H and K. Braces ACF and FDB are made of double angles back to back and are assumed **pinned** inplane and outside plane at A, F and B, and brace CD is also **pinned** at C and D. Member EFG is made of W 150 x 29.8 assumed **fixed** at E and G both inplane and outside plane. Top and bottom flanges of beam HIJK are assumed to be **laterally fixed** at ends H and K, and the upper flange is laterally supported by secondary beams at points I, and J.



1- What is the buckling length of member ACF

	Choose the right answer		Value
	Buckling in Plane	Buckling outside the plane	
KLx			
Kly			

2- What is the buckling length of member EFG

	Choose the right answer		Value
	Buckling in Plane	Buckling outside the plane	
KLx			
Kly			

3- For member ACF, KL_x= 3.50 m and Kl_y = 7.0 m , and P_u= 150 kN, **use the LRFD table** to determine the **lightest double equal angle back to back section**, and its corresponding factored compression load

Lightest double equal angle back to back	Factored compression resistance

4- If member EFG is made of W 150 x 29.8, KL_x= 5.0 m and Kl_y = 6.0 m , **use the LRFD table** to determine the factored compression load

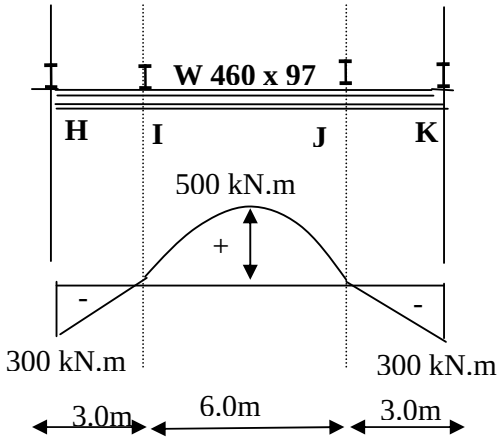
Factored compression resistance

5- Determine the buckling lengths, KL_x and KL_y, of column EH, if it's section is W 310x143

6- For member EH (W 310 x 143) , KLx = 13.0 m and KLy=5.0 m , determine its factored compression resistance

7- For beam HIJK (W 460 x 97) , the top and bottom flanges of beam are assumed to be **laterally fixed** at ends H and K, and the upper flange is laterally supported by secondary beams at points I, and J. The resulted ultimate moment is as shown

a- Determine the factored +ve moment resistance
Hint: if you need C_b for part I J, take it = 1.13



b- Determine the factored -ve moment resistance

c- Is the beam Safe for both +ve and –ve moments