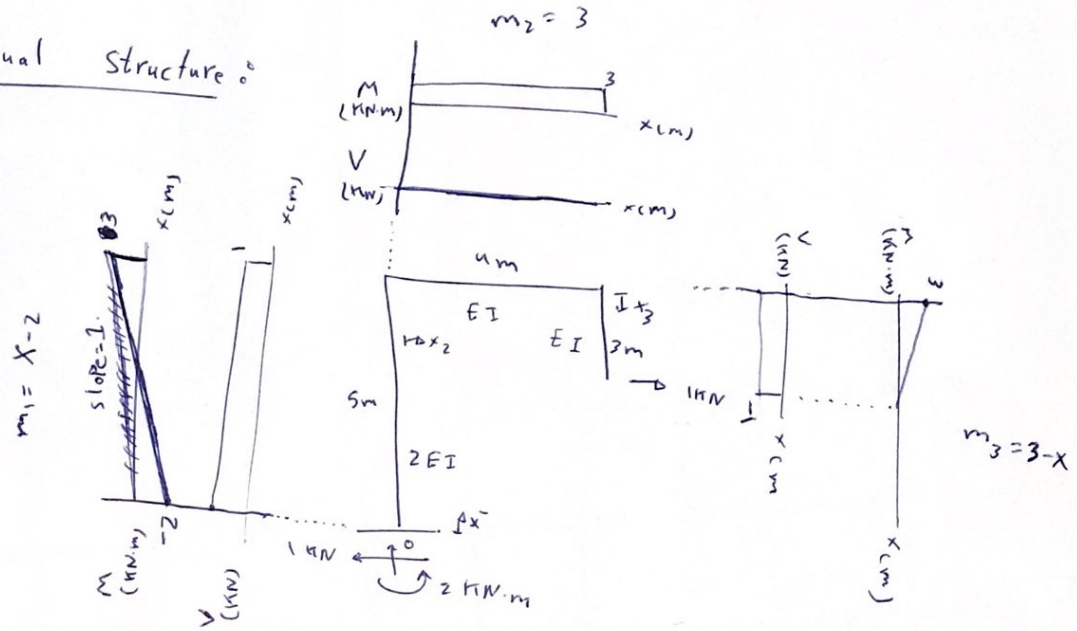
Mohanad Shannak - 1181401.

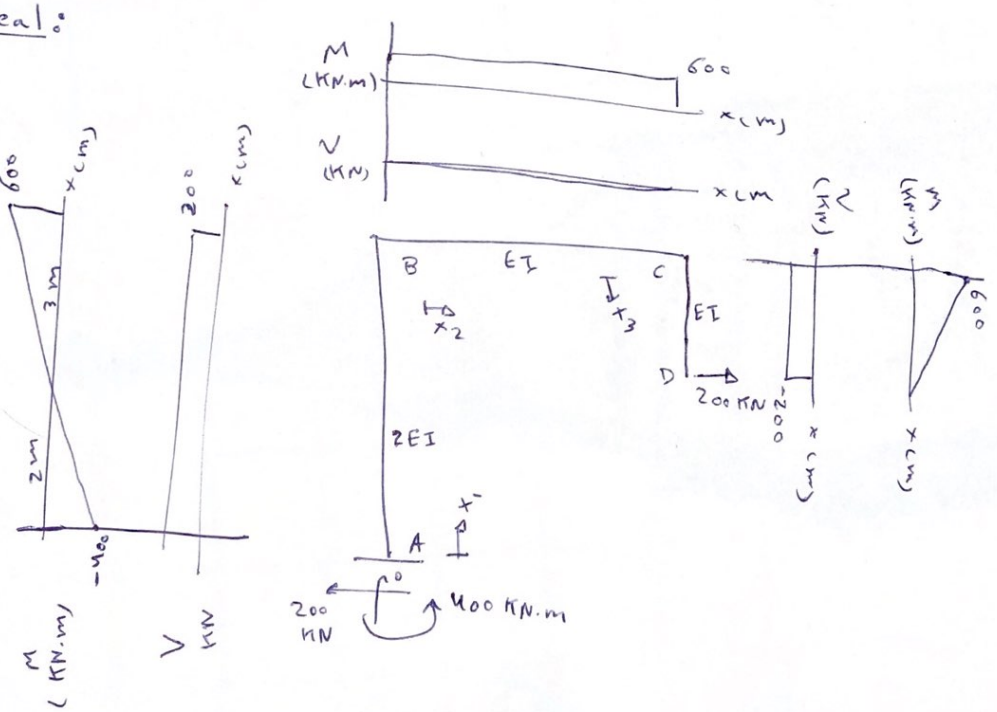
- Assignment - Revision.

- Q.1 :

- virtual Structure :



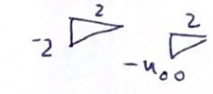
- Real :

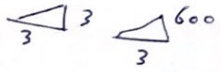


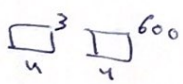
- Virtual work method:

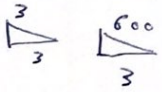
1. $$\Delta D = \int_0^5 \frac{m_1 M_1}{2EI}\,dx_1 + \int_0^4 \frac{m_2 M_2}{EI}\,dx_2 + \int_0^3 \frac{m_3 M_3}{EI}\,dx_3$$

$$= \int_0^2 \frac{m_1 M_1}{2EI}\,dx_1 + \int_2^5 \frac{m_1 M_1}{2EI}\,dx_1 + \int_0^4 \frac{m_2 M_2}{EI}\,dx_2 + \int_0^3 \frac{m_3 M_3}{EI}\,dx_3$$









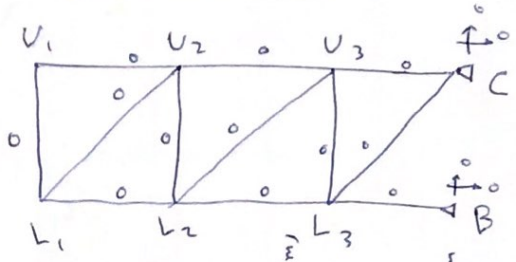
$$= \frac{(2)\ (2)(400)}{(3)(2EI)} + \frac{(3)(3)(600)}{3\,(2EI)} + \frac{(4)(3)(600)}{EI} + \frac{(3)(3)(600)}{3\ EI}$$

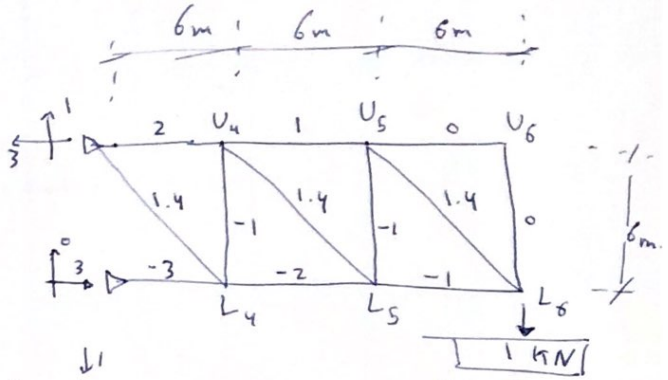
$$= \frac{10\ 166.\overline{6}}{EI}$$

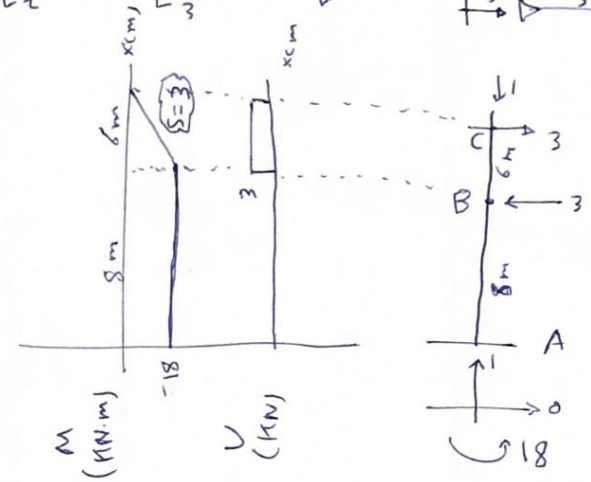
$$\Delta D = \frac{10\ 166.\overline{6}}{EI}$$

- Question "2":

Virtual structure:

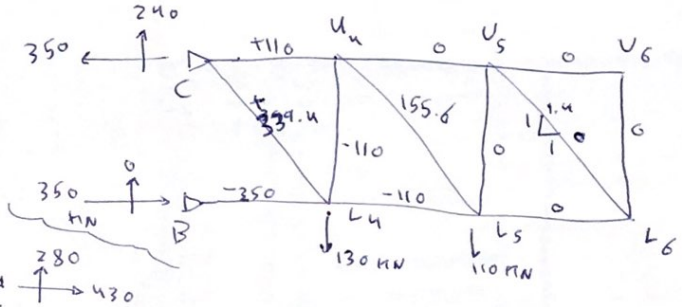


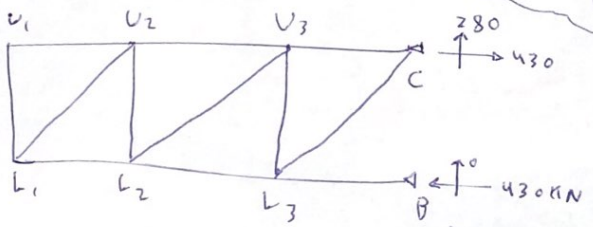


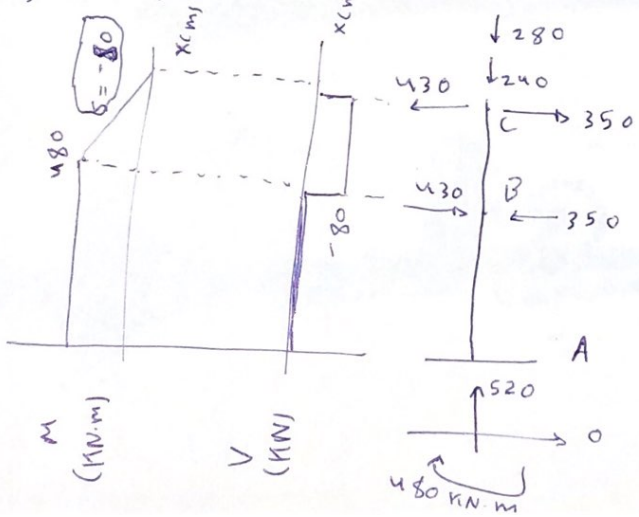


Real structure:

don't need to analyze left segment. (truss).





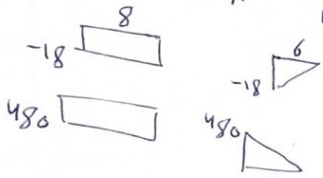


member	n (kN)	N (kN)	L (cm)	(n)*(N)×(L) (kN)·cm
CU_4	2	110	6	1320
CL_4	1.4	339.4	8.485	4032
BL_4	-3	-350	6	6300
U_4L_4	-1	-110	6	660
U_4L_5	1.4	155.6	8.485	1848
L_4L_5	-2	-110	6	1320
			$\Sigma nNL =$	15 480

(n^*N^*L) of other members = 0

- Virtual work method

1. $\Delta L_6 = \int_A^C \frac{mM}{E\,I_{Pier}}\,dx + \Sigma \frac{nNL}{E\,A_{truss}}$



$$\Delta L_6 = \frac{-86\,400}{E\,I_{Pier}} + \frac{15\,480}{(0.005)E\,I_{Pier}}$$

$$\boxed{\Delta L_6 = \frac{3\,009\,600}{E\,I_{Pier}}}$$