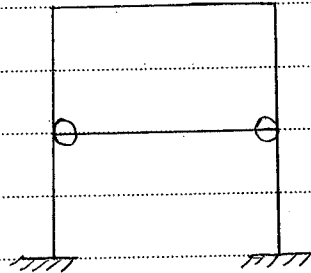
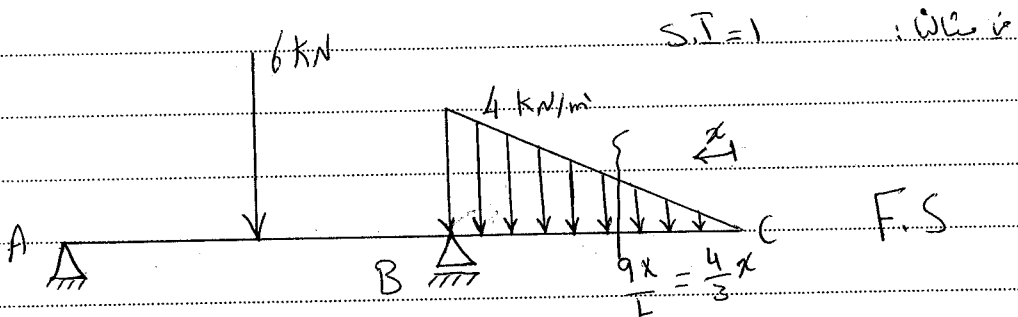
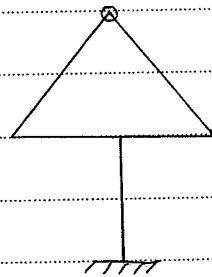


$$S.I = 6 + 3 - 3 - 1(2) = 4$$

$\leftarrow$  حركه افقيه  
 $\leftarrow$  حركه عمودية

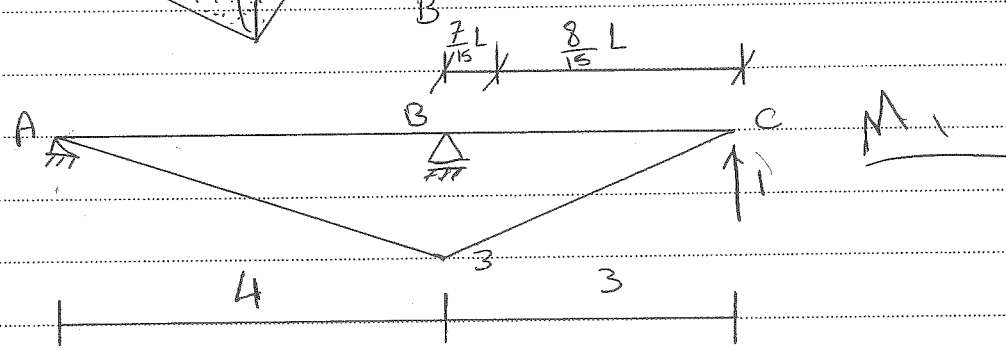
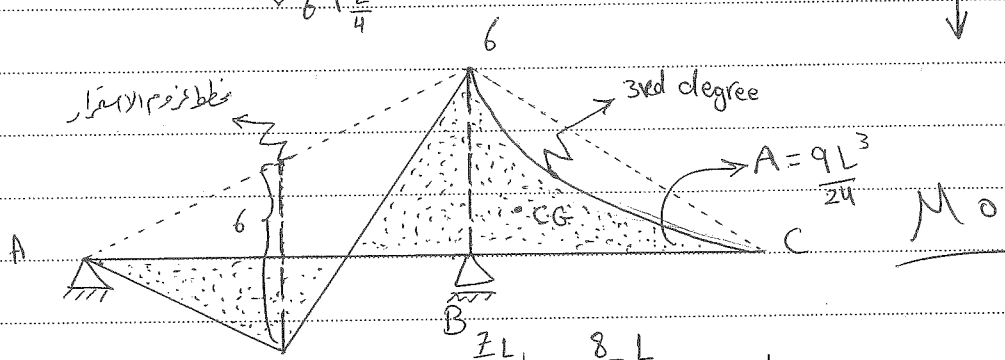
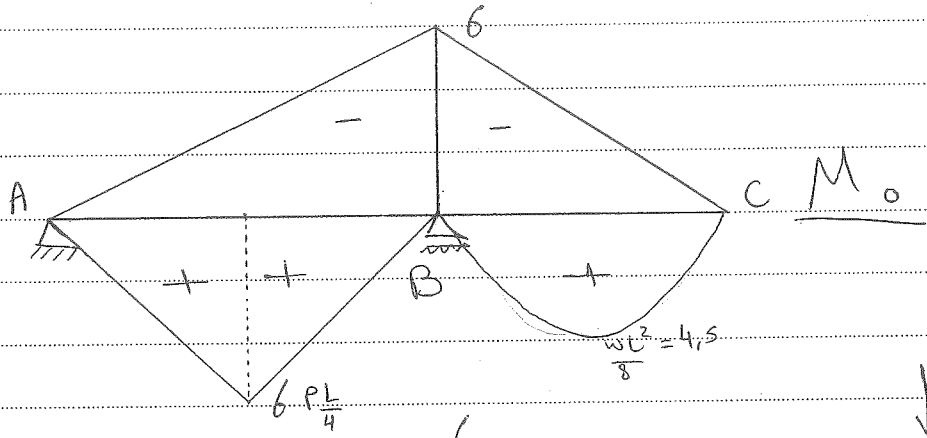


$$S.I = 3 + 3 - 3 - 1 = 2$$



$$M_x = -\frac{2}{9}x^3 = -x \frac{(4)^2}{3} \left(\frac{1}{2}\right) \left(\frac{1}{3}\right) (x)$$

الخطوة التالية هي إيجاد قيم الانكساف



$$\delta_{o1} + P_{11} \alpha_1 = 0$$

$$z_1 = y_c$$

$$\delta_{o1} = \int \frac{M_0 M_1}{EI} dx$$

$$\delta_{o1} = \frac{-(6)(3)(3)}{EI} + \frac{(4)(3)^3}{24} \frac{8}{5} - \frac{(6)(3)(4)}{3EI} + \frac{6(4)(1,5)}{3EI} + \frac{(6)(4)(1,5)}{2EI}$$

$$= -16,8 \frac{8}{EI}$$

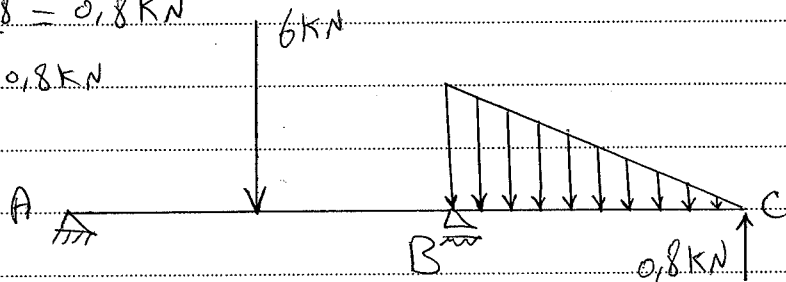
$$P_{11} = \int \frac{M_1 \cdot M_1}{EI} dx$$

$$P_{11} = \frac{(3)^3}{3EI} + \frac{(3)^2(4)}{3EI} = \frac{21}{EI}$$

$$-16,8 + 21x_1 = 0$$

$$x_1 = \frac{16,8}{21} = 0,8 \text{ KN}$$

$$y_c = x_1 = 0,8 \text{ KN}$$



طريقة صيغة لحساب ردود الأفعال:

حيث  $M_1, M_0$  ردود الأفعال في الجملة

$$\Rightarrow Y_B = Y_{B_0} + Y_{B_1} x_1$$

نماذج الطريقة بطريقة مع  $x_1$

$$R = R_0 + r_1 x_1$$

$$Y_B = 10,5 + \frac{7}{4} (0,8)$$

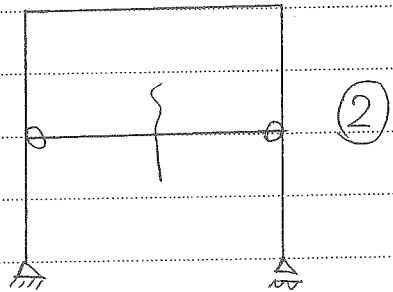
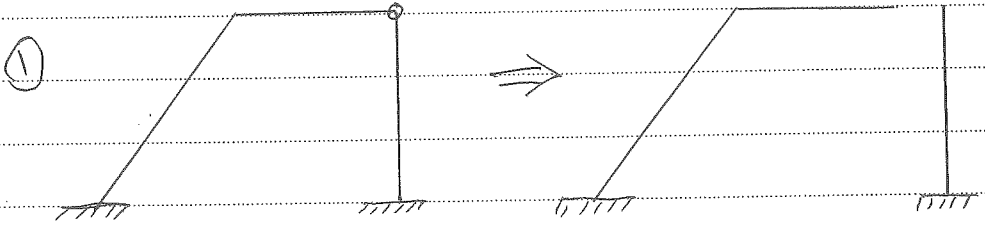
و بطريقة صيغة نظام المعادلات:

$$[R] = [R_0] + [r_1] \{x_1\}$$

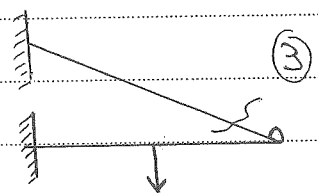
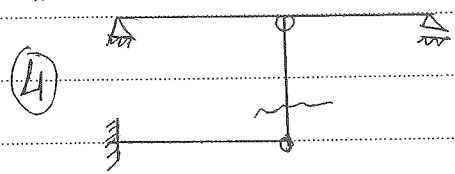
$$\begin{bmatrix} Y_A \\ Y_B \end{bmatrix} = \begin{bmatrix} 1,5 \\ 10,5 \end{bmatrix} + \begin{bmatrix} -\frac{3}{4} \\ \frac{7}{4} \end{bmatrix} \{0,8\} = \begin{bmatrix} 0,9 \\ 11,9 \end{bmatrix}$$

$$M_{\text{Final}} = M_0 + M_1 x_1$$

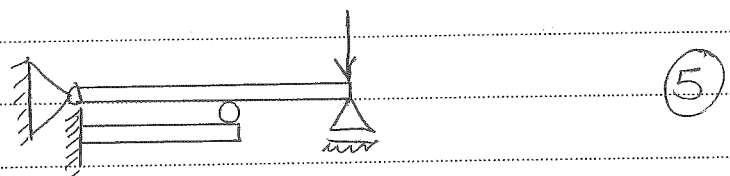
أجزاء الإنزلة عدم بقرير لأفضل النتائج وأوسع الطوت.



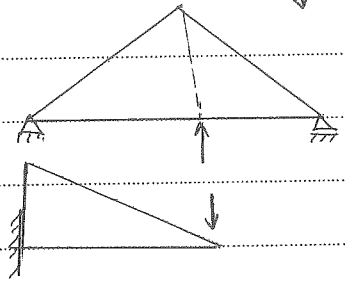
mixed structure



هذه الحالة كانت اعتماد العمود العام المين (كما قال الدكتور الطويل)

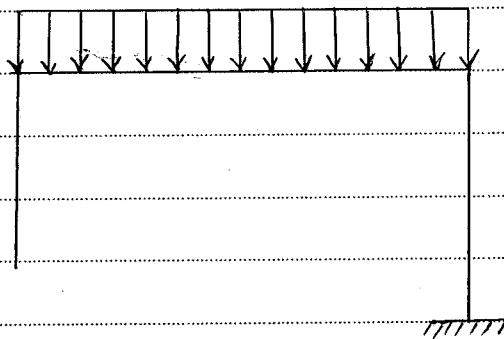
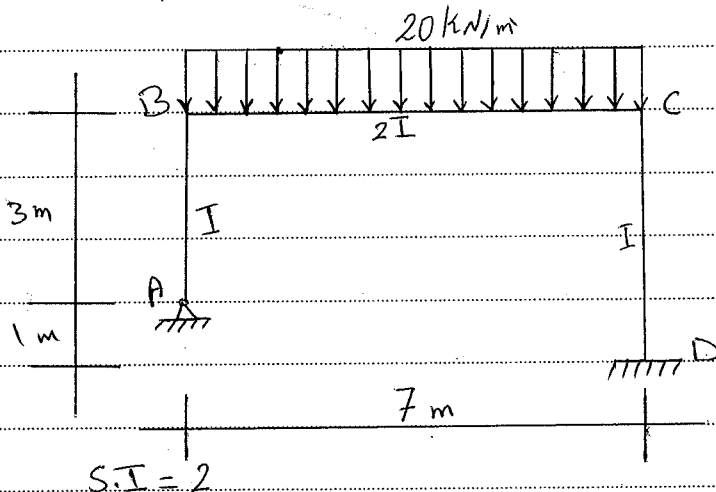


نزل البعد ونسبته بعمود (↑) ويكون فقط من الانطاف كالسائل:



Exam example :

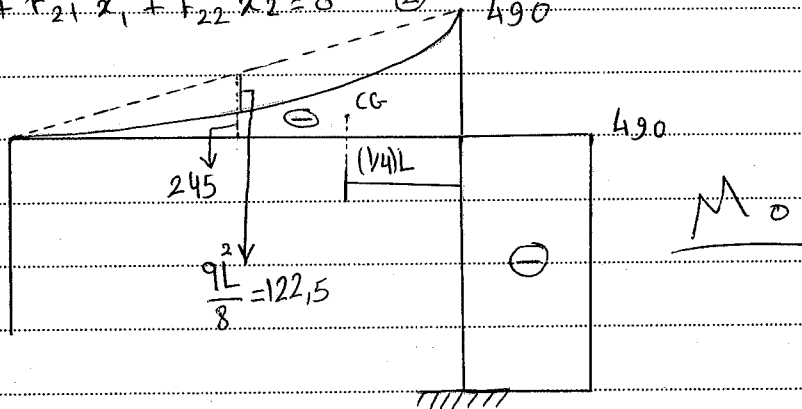
مثال امتحاني :

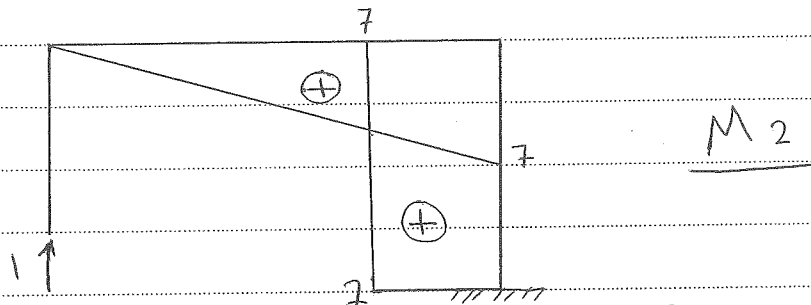
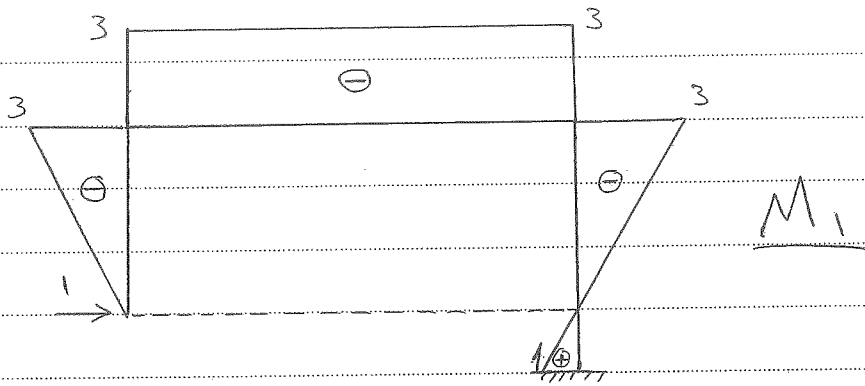


F.S

$$\delta_{o1} + P_{11} x_1 + P_{12} x_2 = 0 \quad (1)$$

$$\delta_{o2} + P_{21} x_1 + P_{22} x_2 = 0 \quad (2)$$





$$\delta_{01} = \frac{1}{2EI} \left[ -\frac{1}{3}(7)(490) \left( \frac{3}{4} \right) (7) \right] + \frac{1}{EI} \left[ (-7)(4)(490) \right] = \frac{-16721,3}{EI}$$

$$\delta_{02} = \frac{1}{2EI} \left[ \frac{1}{3}(7)(490)(3) \right] + \frac{1}{EI} \left[ \frac{(3)(3)(490)}{2} \right] + \frac{1}{EI} \left[ -\frac{1}{2}(1)(490) \right]$$

$$\delta_{02} = \frac{367,5}{EI}$$

$$P_{11} = \frac{1}{2EI} \left[ \frac{(7)^3}{3} \right] + \frac{1}{EI} \left[ (7)(4)(7) \right] = \frac{253,17}{EI}$$

$$P_{22} = \frac{1}{EI} \left[ \frac{(3)^3}{3} + (3)(7)(3) + \frac{(3)^3}{3} + \frac{(1)^3}{3} \right] = \frac{49,83}{EI}$$

$$P_{12} = P_{21} = \frac{1}{EI} \left[ -\frac{(7)(7)(3)}{2} - \frac{(3)(3)(7)}{2} + \frac{(1)(1)(7)}{2} \right]$$

$$P_{12} = P_{21} = \frac{-64,75}{EI}$$

حل المادتين ① و ② يكون :

$$x_1 = 70,7 \text{ KN}, x_2 = 18,1 \text{ KN}$$

$$M_{\text{final}} = M_0 + M_1 x_1 + M_2 x_2$$

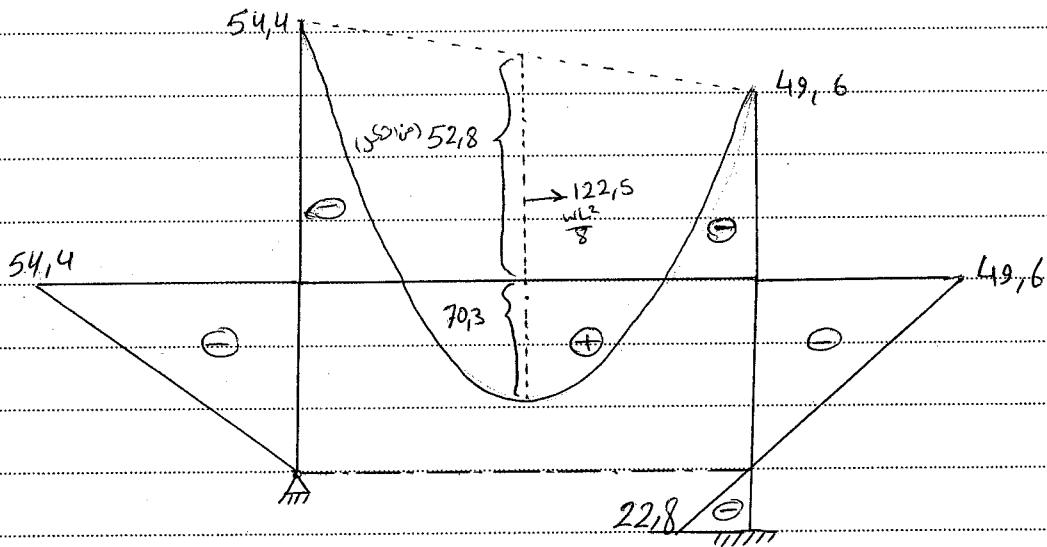
$$M_B = 0 + 0 - 3x_2 = -54,3 \text{ KN.m}$$

↓  
18,1

$$M_C = -490 + 7(70,7) - 3(18,1) = -49,6 \text{ KN.m}$$

$$M_A = 0$$

$$M_D = -490 + 7(70,7) + 1(18,1) = 22,8 \text{ KN.m}$$



مع التحيات للباحث والزميلين

— انتم الكما جيرة —

عبدالله

0938408492