

الحاصل

$$\mu_a = \mu_d$$



APPLY 3. Moment. eqⁿ at Point (a):-

$$M_0 \left(\frac{0}{I_0} \right) + 2M_a \left(\frac{0}{I_0} + \frac{6}{I} \right) + M_b \left(\frac{6}{I} \right) = -6 \left(\frac{R_0}{I_0} + \frac{18}{I} \right)$$

$$2M_a + M_b = -18 \longrightarrow [1]$$

*APPLY 3. Moment. eqⁿ at Point (b):-

$$M_a \left(\frac{6}{I} \right) + 2M_b \left(\frac{6}{I} + \frac{9}{2I} \right) + M_b \left(\frac{9}{2I} \right) = -6 \left(\frac{18}{I} + \frac{54}{2I} \right)$$

$$6M_a + 21M_b + 4.5M_b = -270$$

$$6M_a + 25.5M_b = -270 \longrightarrow [2]$$

$$-3 \times 2M_a + M_b = -18$$

$$6M_a + 25.5M_b = -270$$

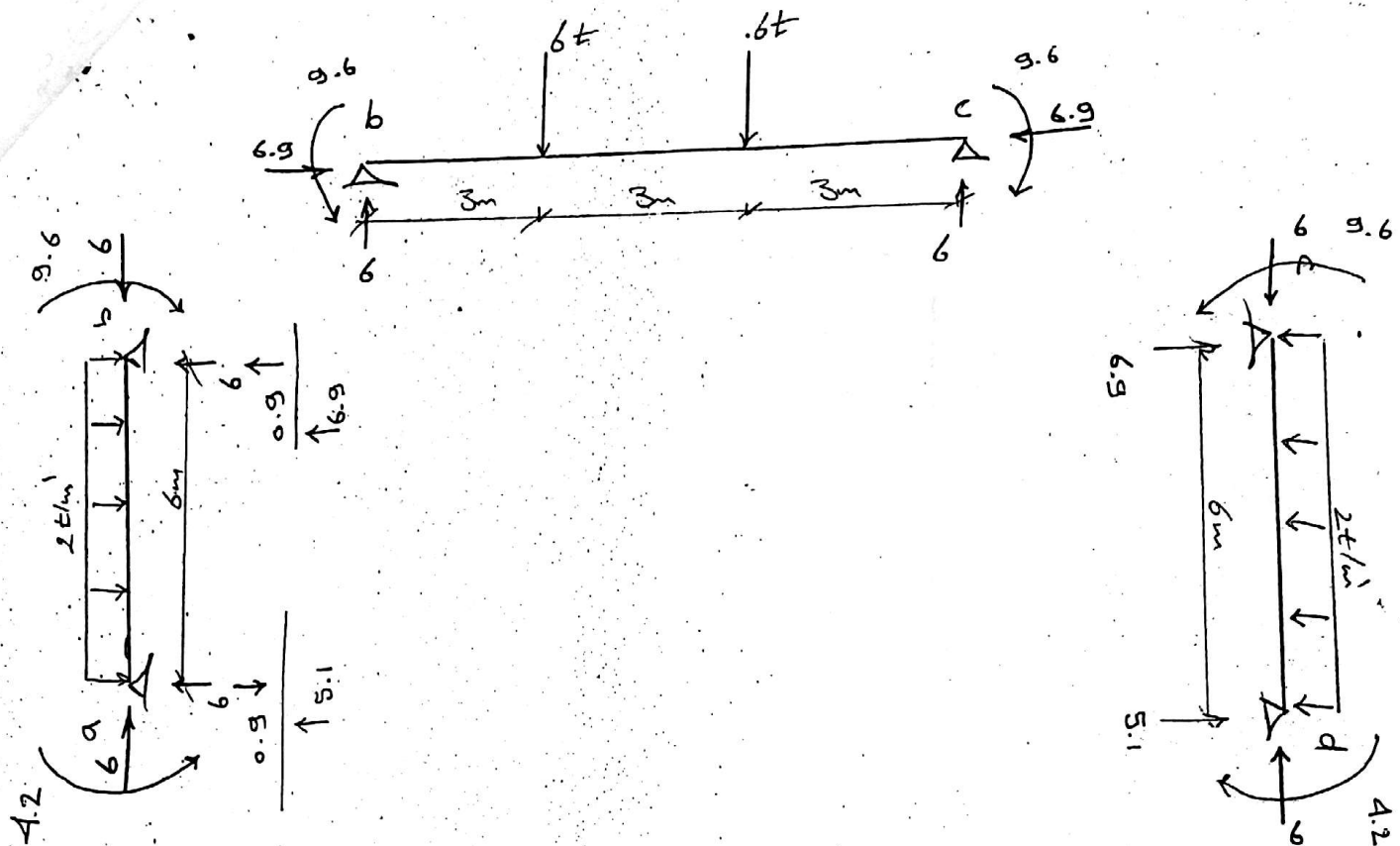
$$-6M_a - 3M_b = +54$$

$$6M_a + 25.5M_b = -270$$

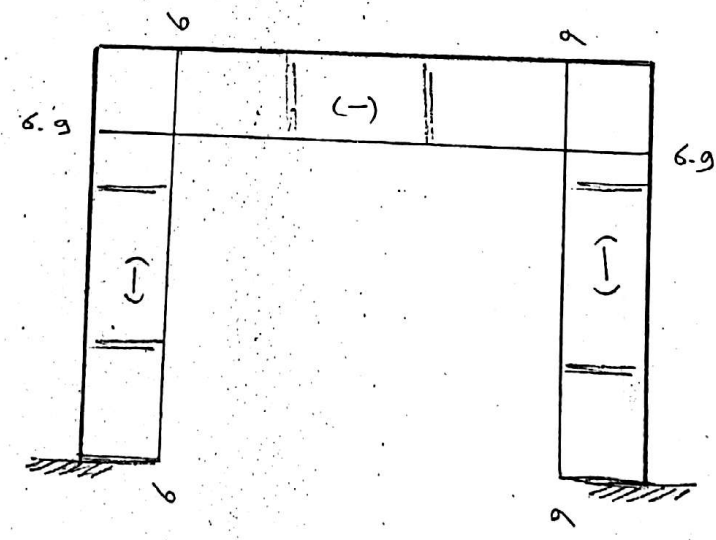
$$22.5M_b = -216 \Rightarrow M_b = -9.6 \text{ m.t}$$

$$M_a = -4.2 \text{ m.t}$$

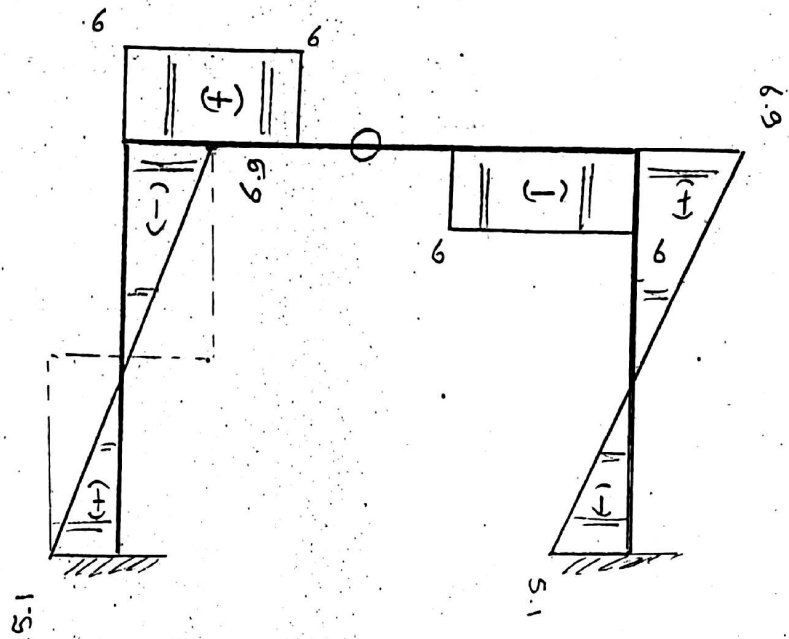
(2)



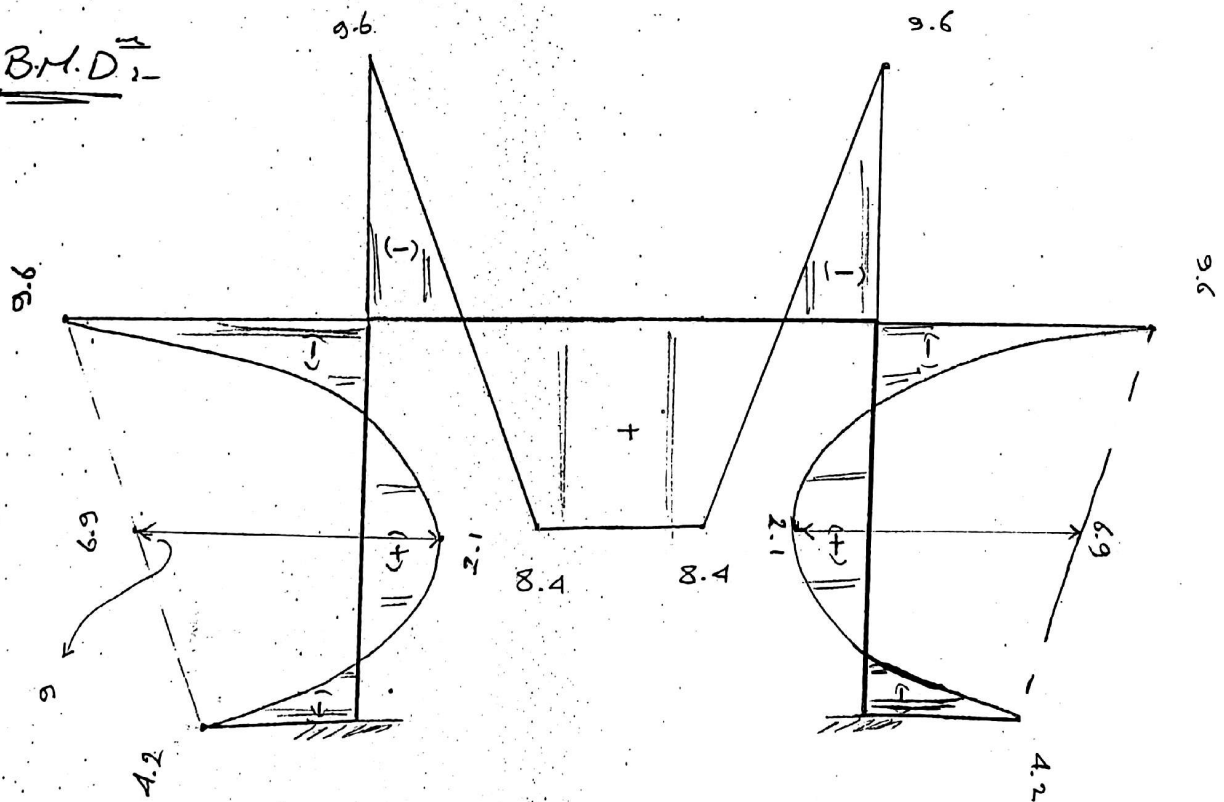
B.N.F.D.



S.F.D

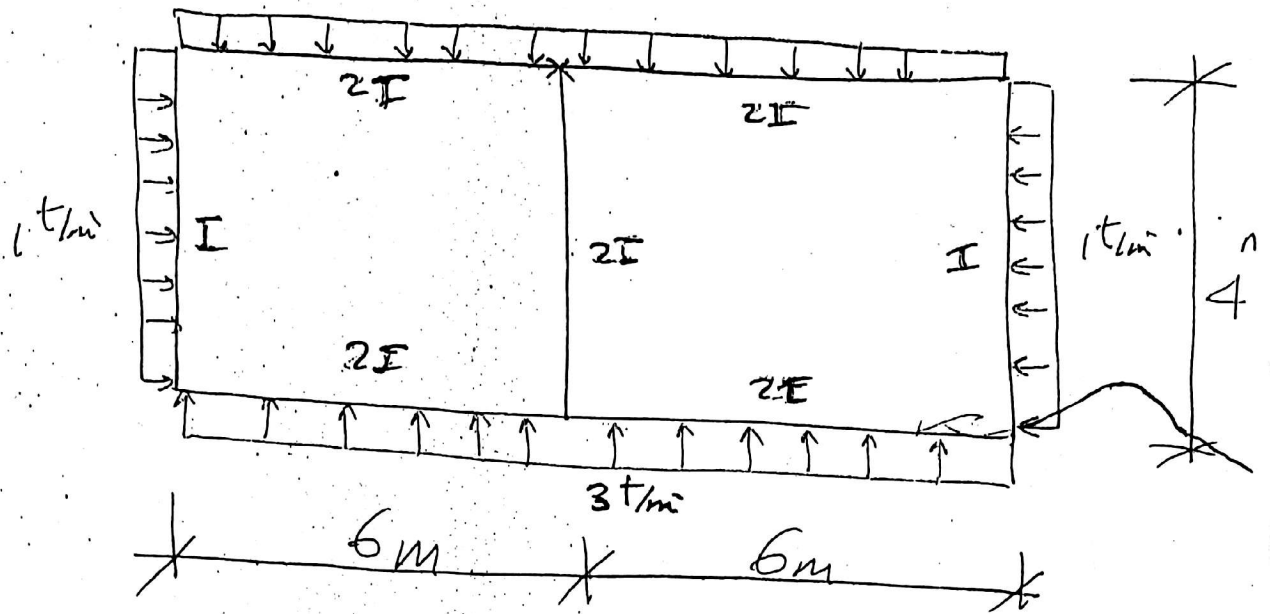
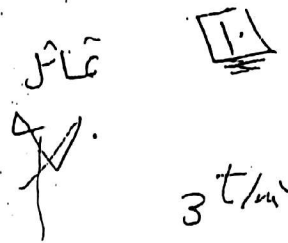


* B.M.D



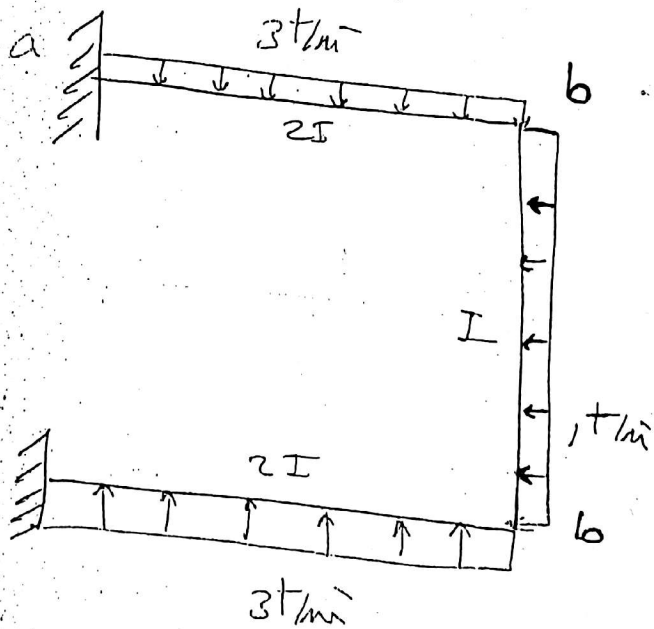
4

Ex. (5):-

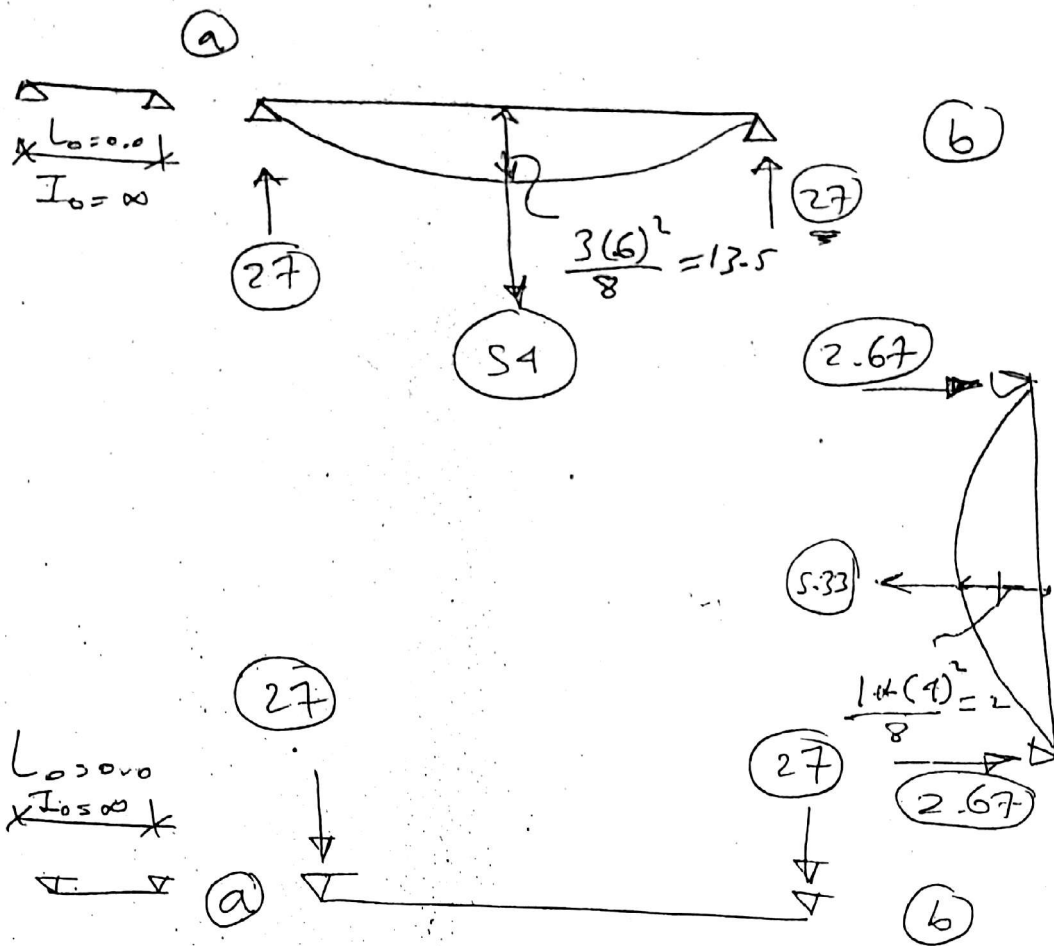


سوال الثاني بر بروج (Frame) فترجى

Fixed



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Apply 3-m eqn at (a) :-

$$0.0 + 2M_a \left(0.0 + \frac{6}{2I} \right) + M_b \left(\frac{6}{2I} \right) = -6 \left(0.0 + \frac{27}{2I} \right)$$

$$2M_a + M_b = -27$$

(6)

Apply 3.m. eqn at (b) :-

$$M_a\left(\frac{6}{27}\right) + 2M_b\left(\frac{6}{27} + \frac{4}{2}\right) + M_b\left(\frac{4}{2}\right)$$

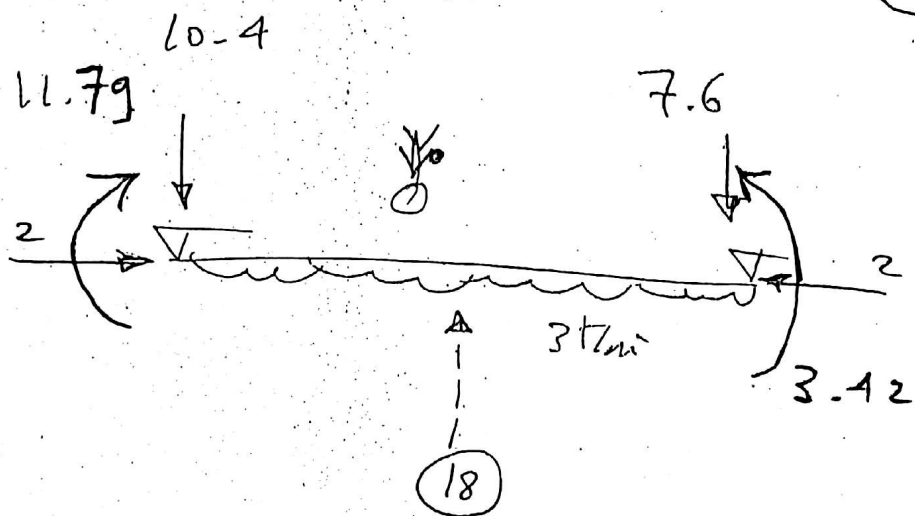
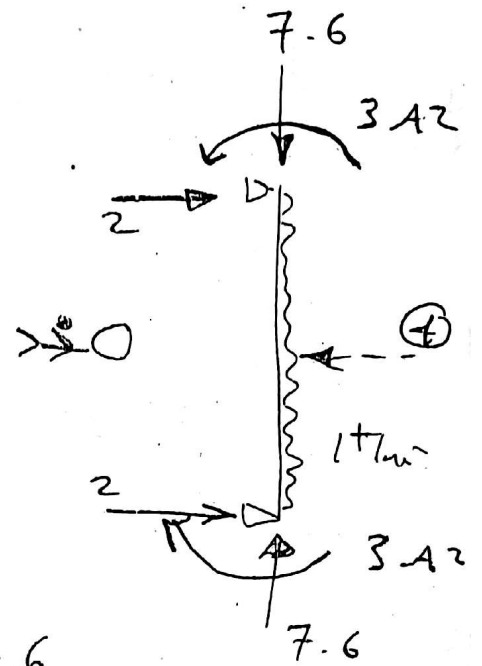
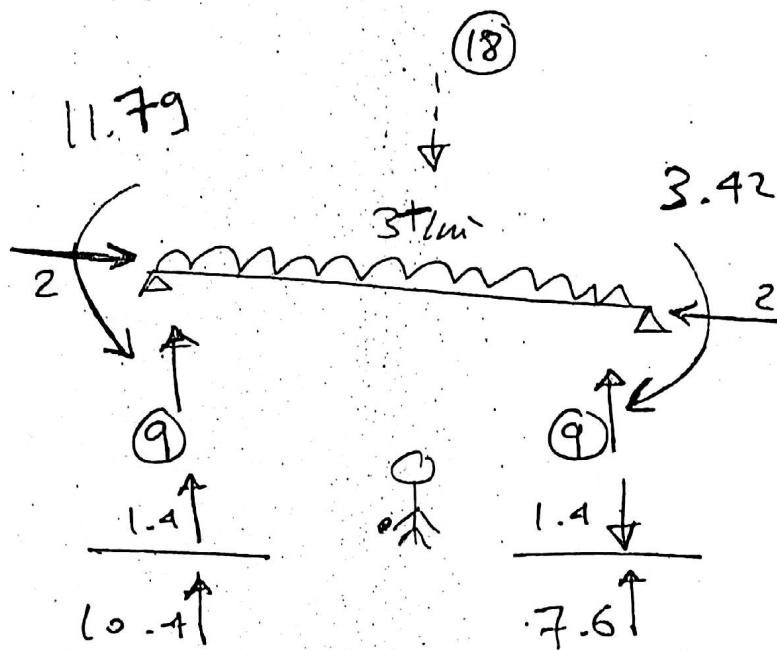
$$= -6\left(\frac{27}{27} + \frac{2 \cdot 64}{2}\right)$$

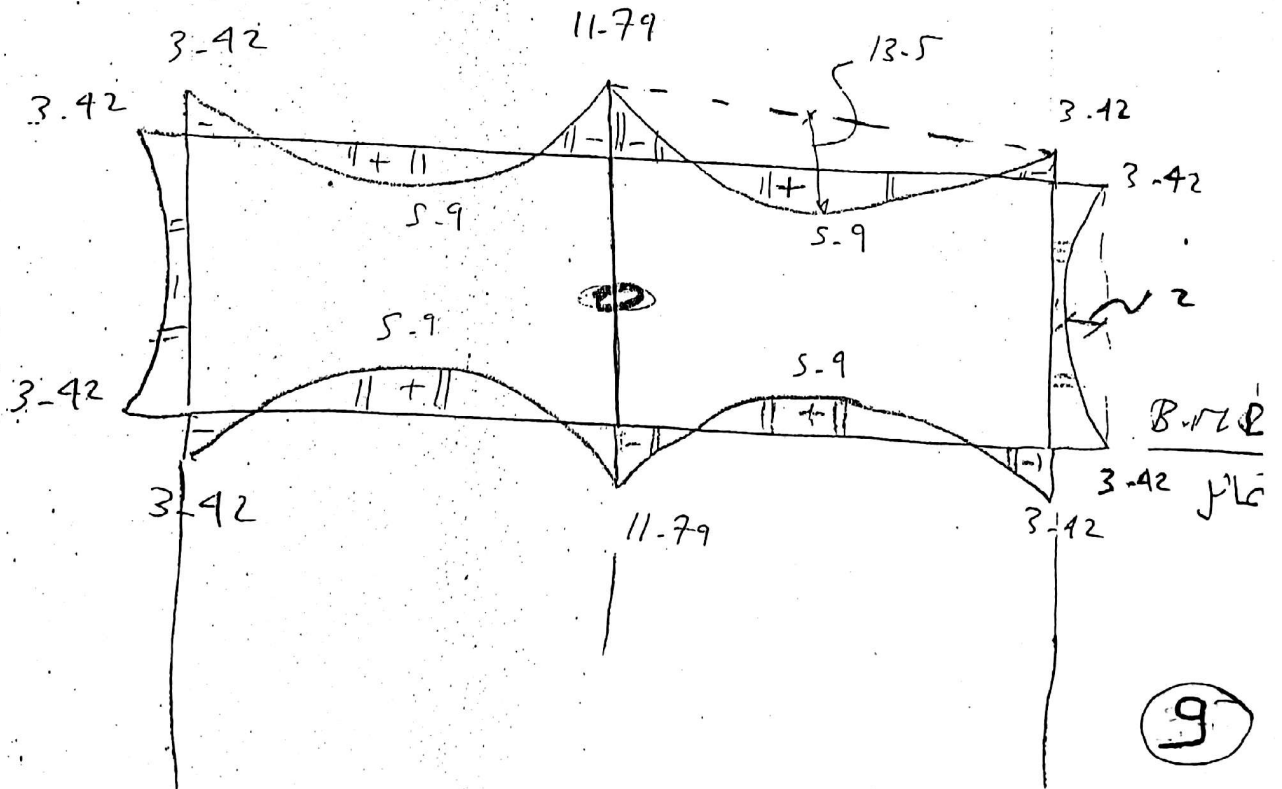
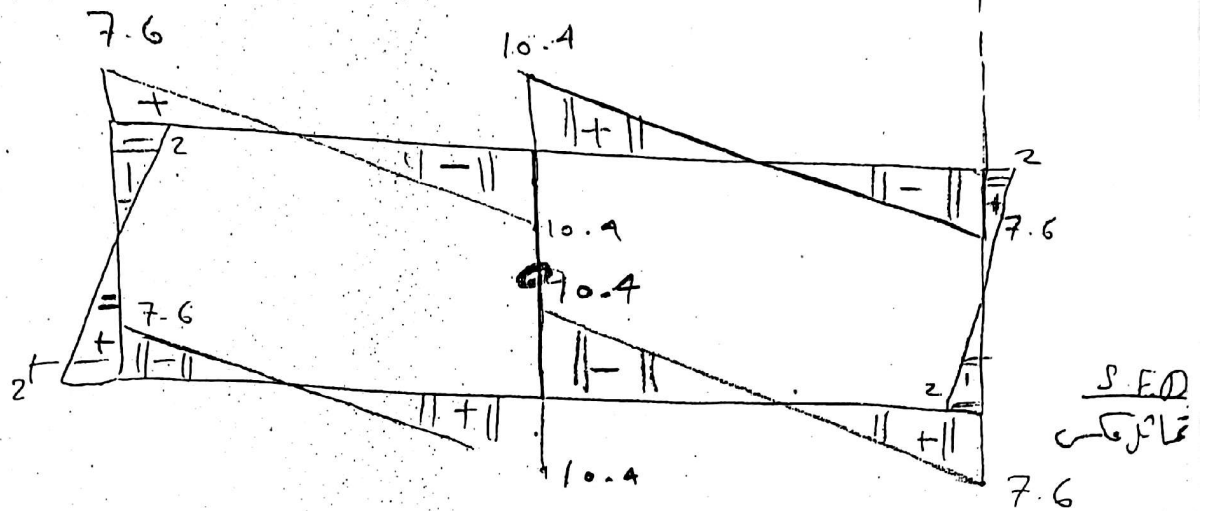
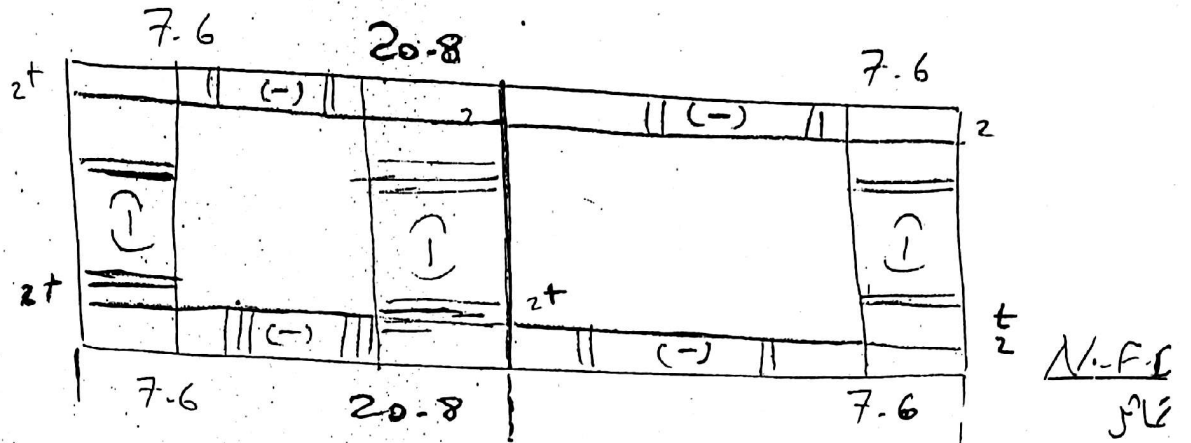
$$3M_a + 18M_b = -97 \quad \text{--- (2)}$$

Solve (1), (2) to get :-

$$M_a = -11.79 \text{ mt}$$

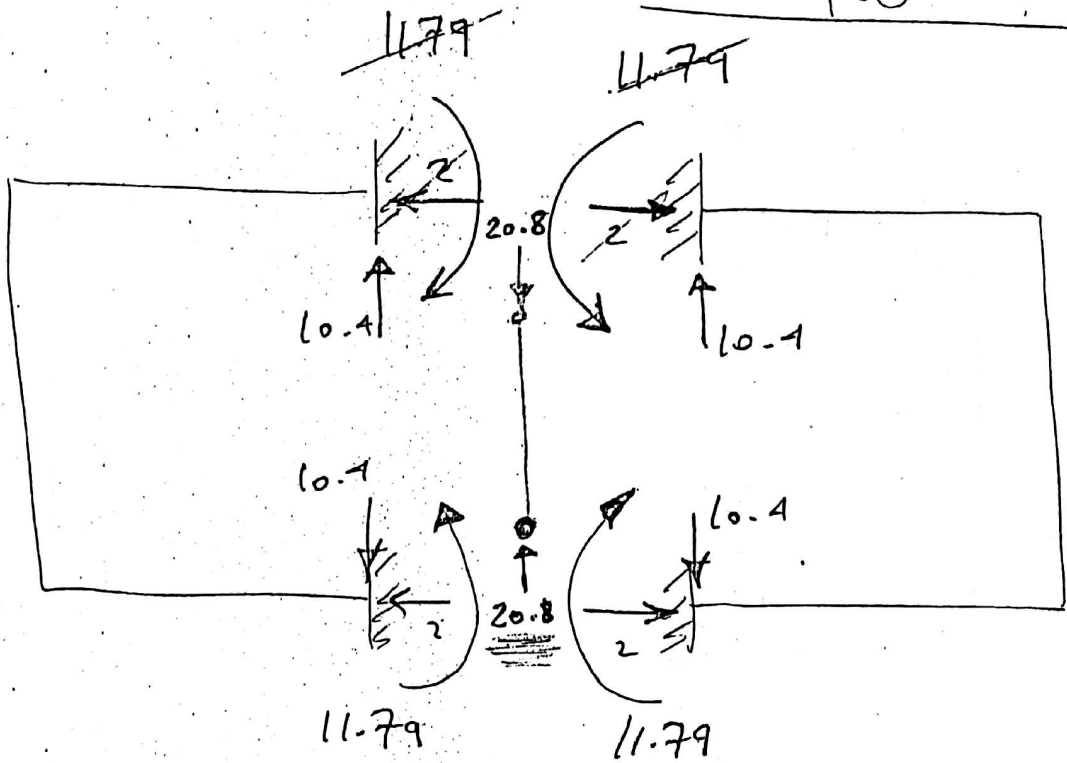
$$M_b = -3.42 \text{ mt}$$





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بالنسبة للزلازل:



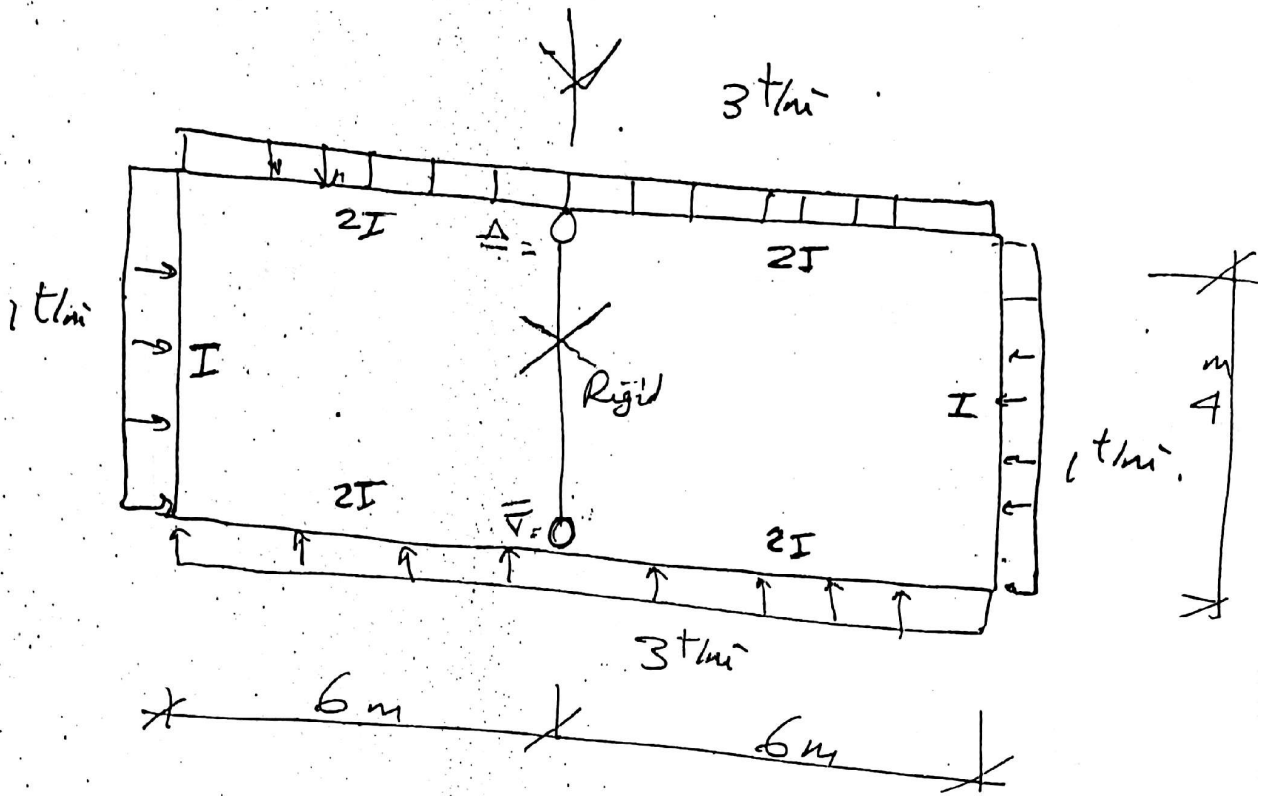
N.F. = ☒ الزلازل
تساوي صافيها في الفعل

S.F. = Zero

B.M. = Zero

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فکرة: نتواند با بهر مع جمل را در جملی

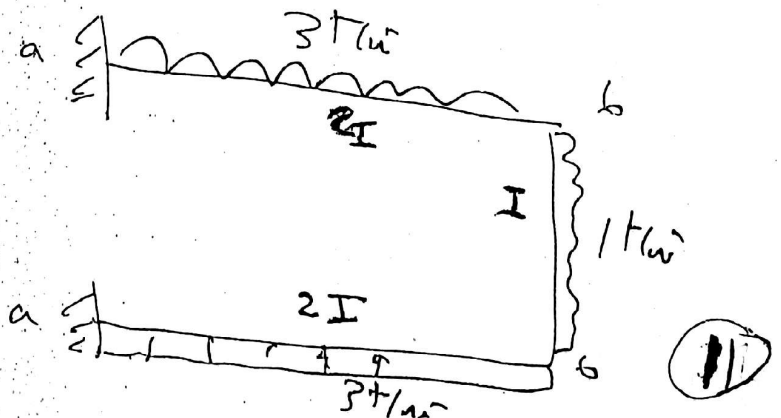


ملحقہ: ۱۔ یہ ایک رگیدہ (link) \rightarrow Rigid

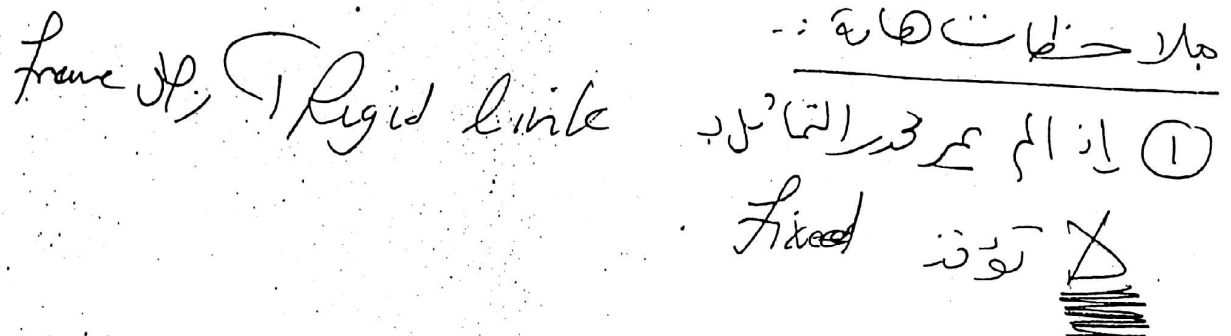
لکھنؤ نظریات (3.17-eqn)

٥) اذا رسمنا التماسك

$\text{end } \tau_0(\psi) \rightarrow \rho \leftarrow \tau_0(\psi)$



3 1/4



تیسری قسم: Rigid link series (c)

Apply 3.11. eqn at (a) :-

$$M_a(\frac{6}{1}) + 2M_b(\frac{6}{1} + \frac{6}{2}) + M_b(\frac{6}{2}) \\ = -6(0 + \frac{27}{2})$$

$$24 M_a + 3 M_b = -81 \quad \text{--- (1)}$$

Apply 3.11. eqn at (b) :-

$$M_a(\frac{6}{2}) + 2M_b(\frac{6}{2} + \frac{9}{2}) + M_b(\frac{9}{2}) \\ = -6(\frac{27}{2} + \frac{9 \cdot 1.25}{2})$$

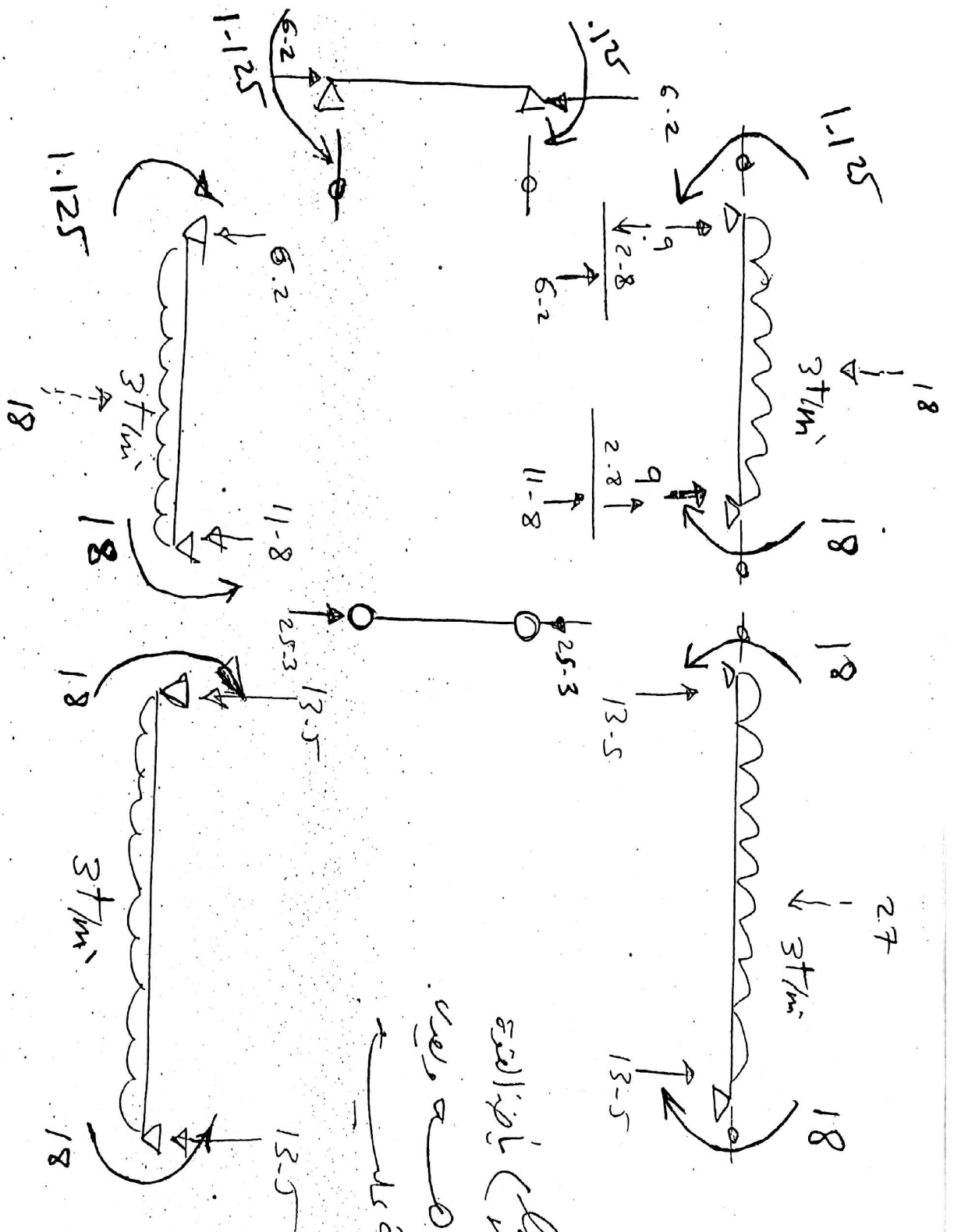
$$3 M_a + 19.5 M_b = -354.375 \quad \text{--- (2)}$$

Solve (1) & (2) to get

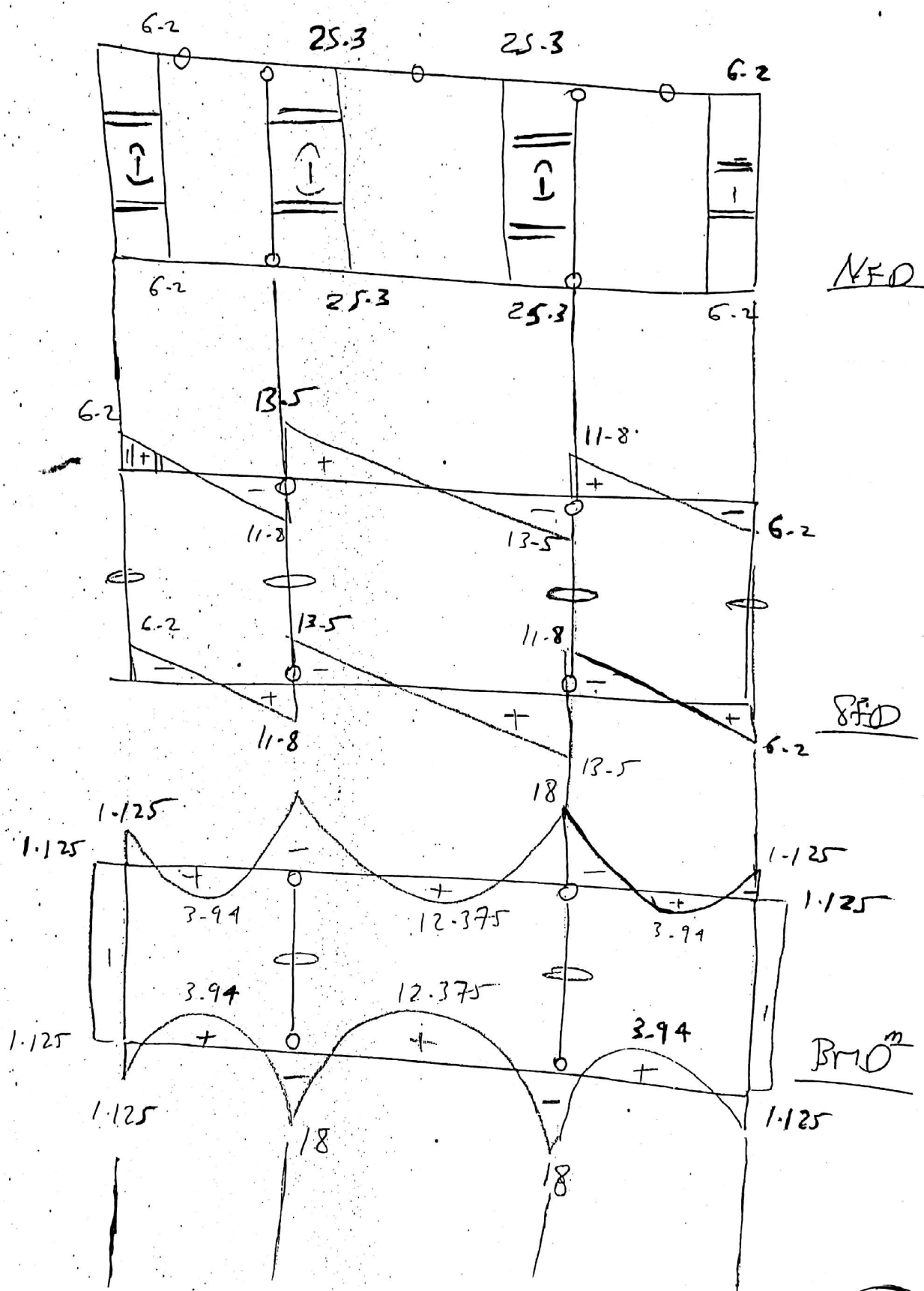
$$M_a = -1.125 \text{ m.t.}$$

$$M_b = -18 \text{ m.t.}$$

(14)

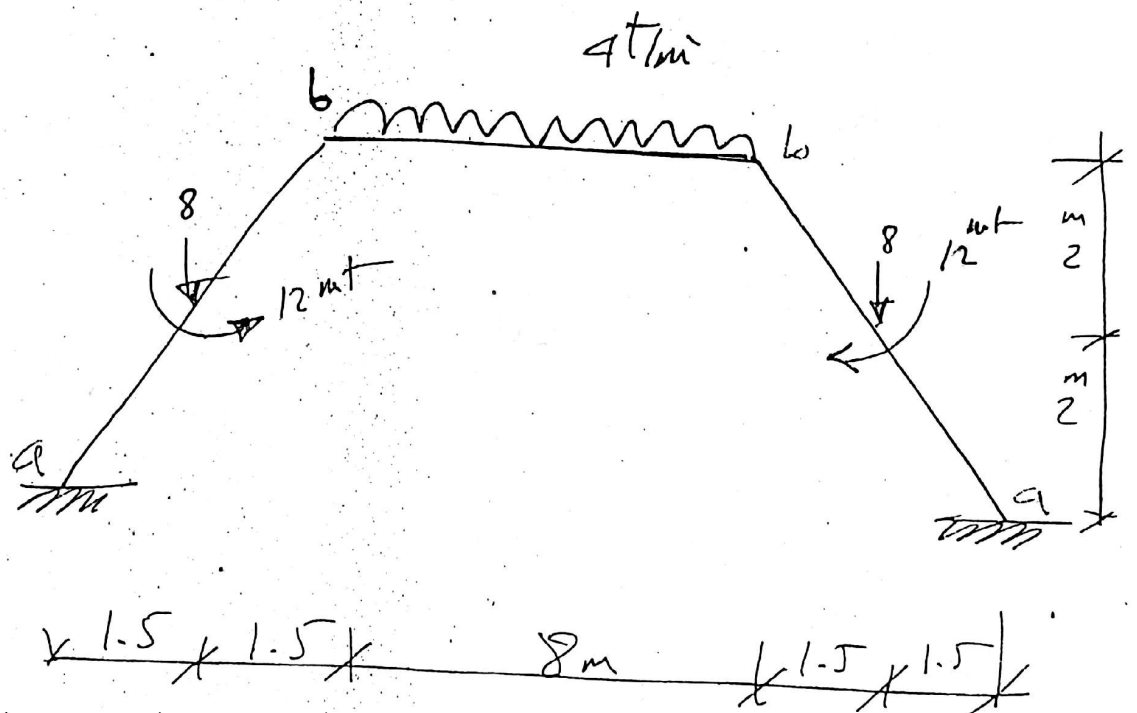
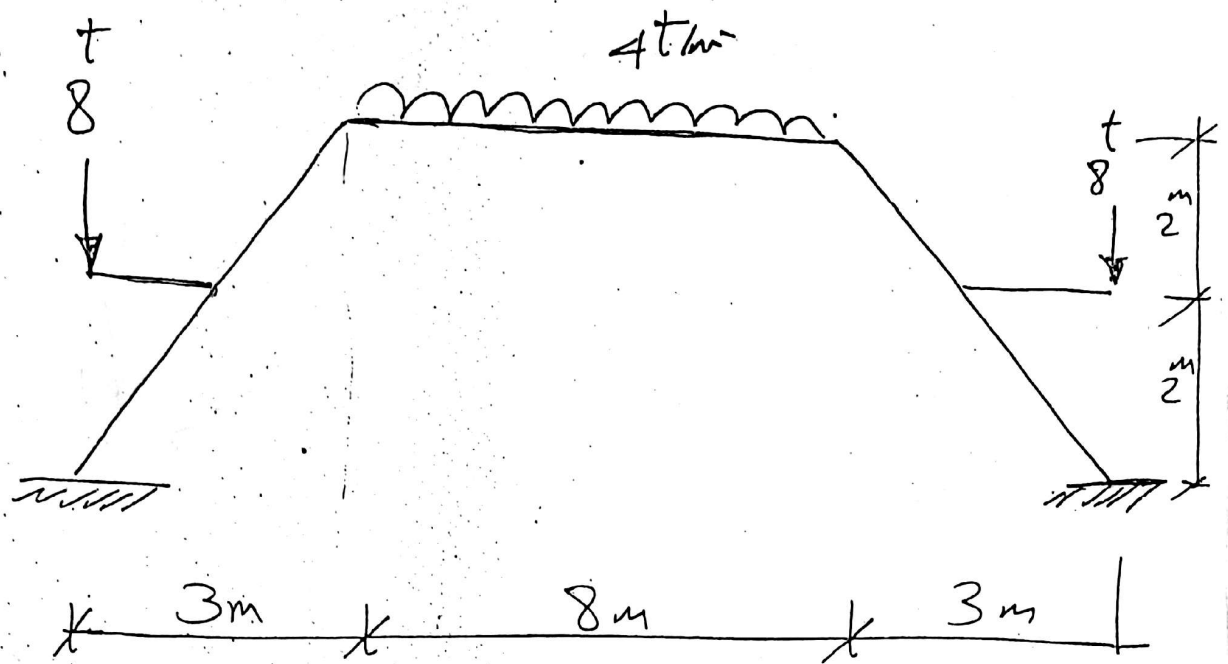


* ١- إلكتروني (link members) إلى إلكتروني

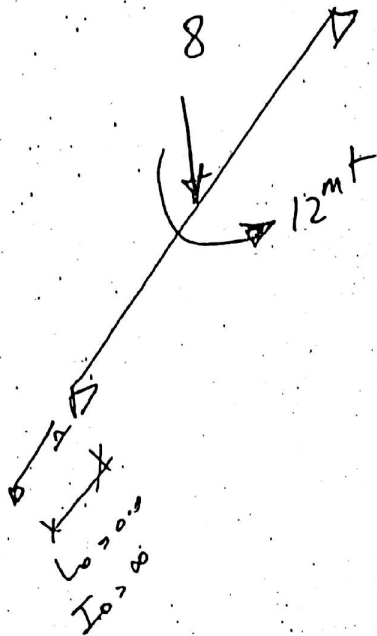
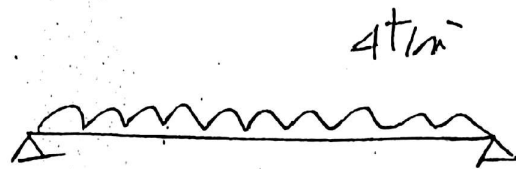


Ex. (7):-

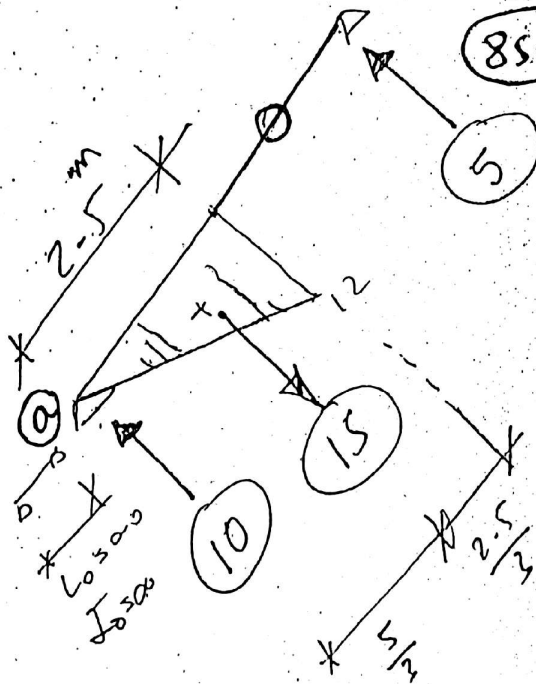
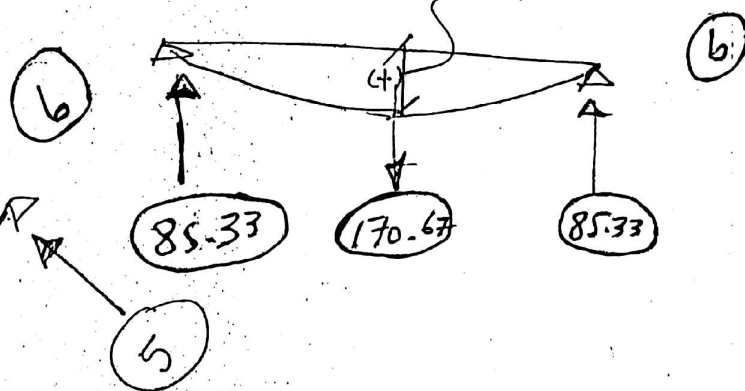
Const (I)



17

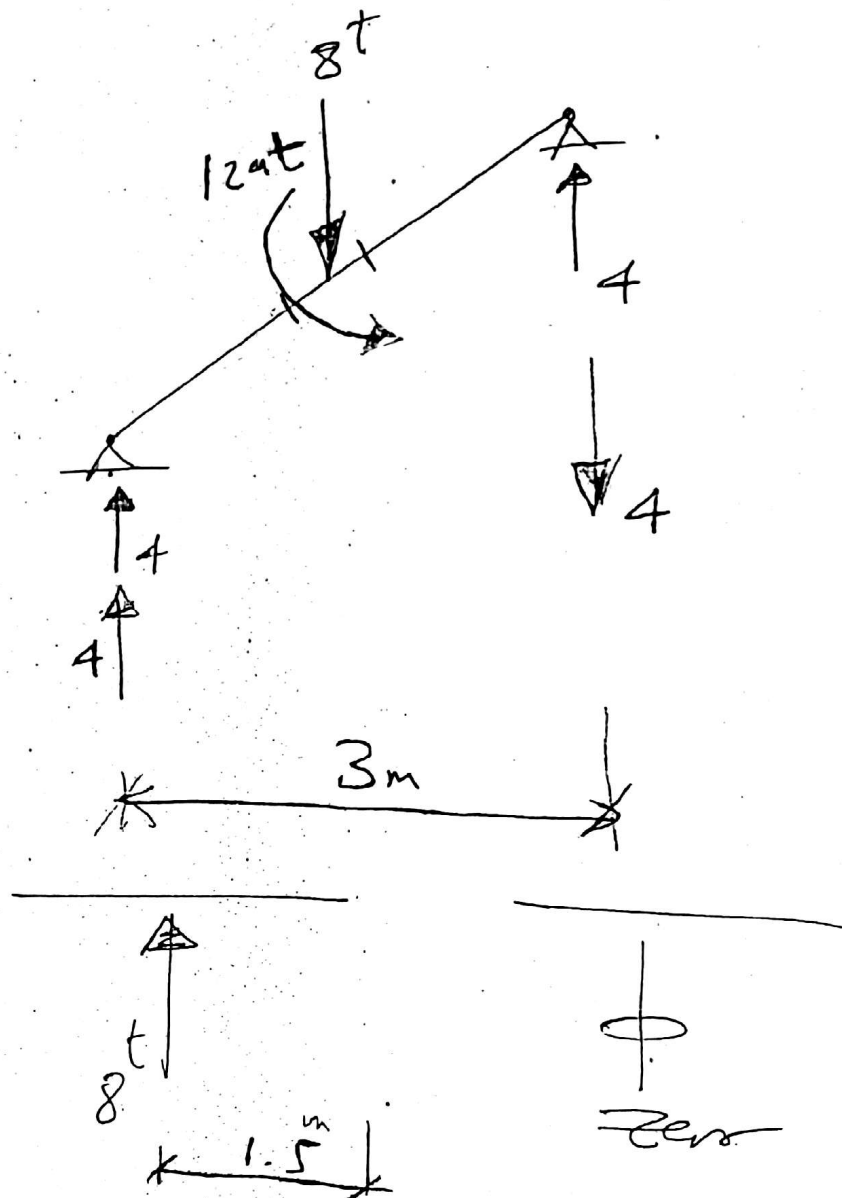


$$\frac{4(8)^2}{8} = 32$$



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بالنسبة للضغط، الجانبي -



Apply 3.M-egⁿ at (a) :-

$$0.0 + 2M_a(0.0 + 5) + M_b(5) \\ = -6(0.0 + 10)$$

$$2M_a + M_b = -12 \quad \text{①}$$

Apply 3.M-egⁿ at (b) :-

$$M_a(5) + 2M_b(5+8) + M_b(8)$$

$$= -6(5 + 85.33)$$

$$5M_a + 34M_b = -542$$

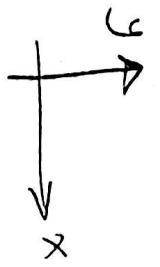
②

Solve ①, ② to get

$$M_a = 2.13 \text{ mt}$$

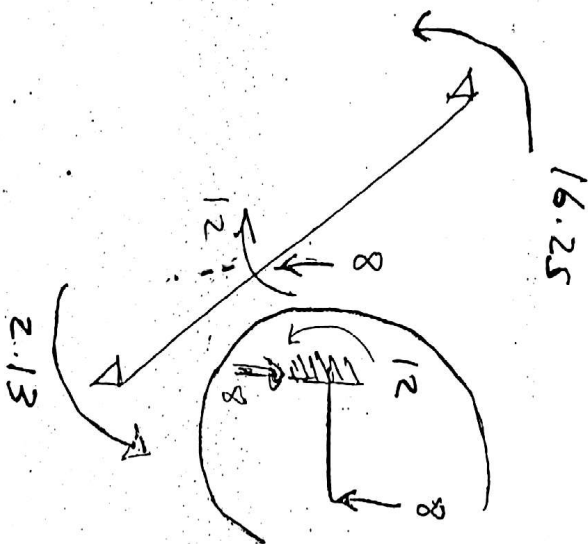
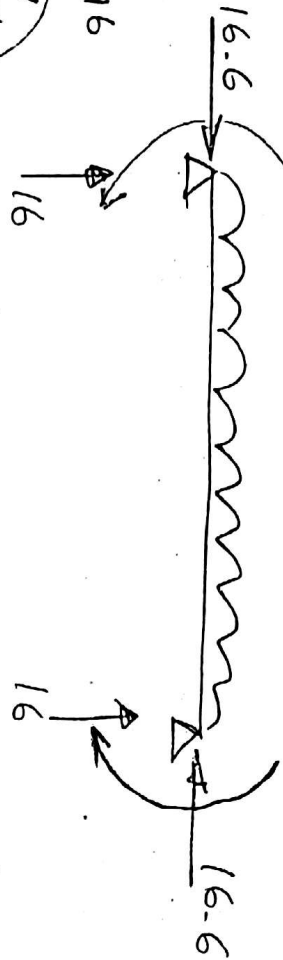
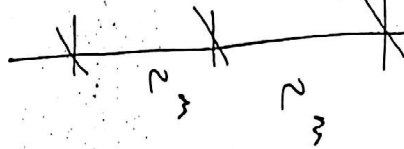
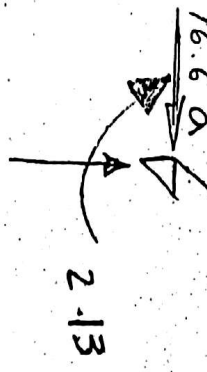
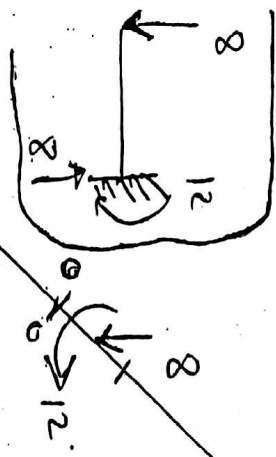
$$M_b = -16.25 \text{ mt}$$

20



32
4t/m
16.25
16.25
16.6
16.6

21



24 1.5m 1.5m

الضلع الثاني

①

قوله الاخر ان حالة وجود ضلعين

والتي هي اقل من (الضلع الثاني) والتي هي اقل من (الضلع الثاني) ...

الضلع

بالنسبة للضلع الثاني،

$$\sum M_a = 0 \rightarrow \text{للضلع الثاني،}$$

$$+16.25 - 12 + 2 \cdot 13 + 16 \cdot 3 \\ + 8 \cdot 1.5 - X \cdot 4 = 0$$

$$X = 16.6 \text{ ton.}$$

* لرسم الـ (K/F) د.ف. للضلع الثاني

كيب على التند

BMD^m

$$M_{0-0} = +2 \cdot 13 + 24 \cdot 1.5 \\ - 16.6 \cdot 2$$

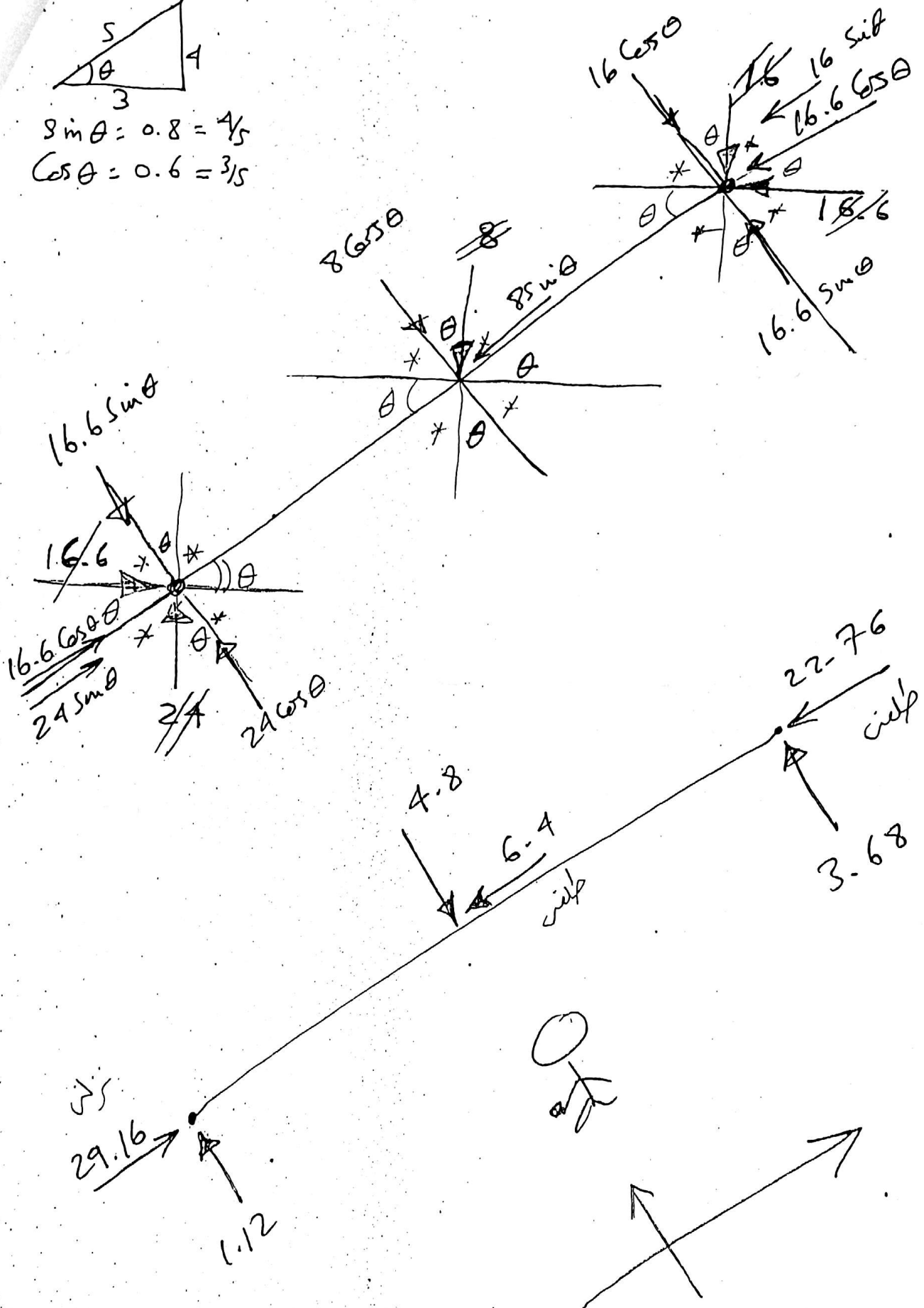
$$M_{0-0} = +4.93 \text{ mt}$$

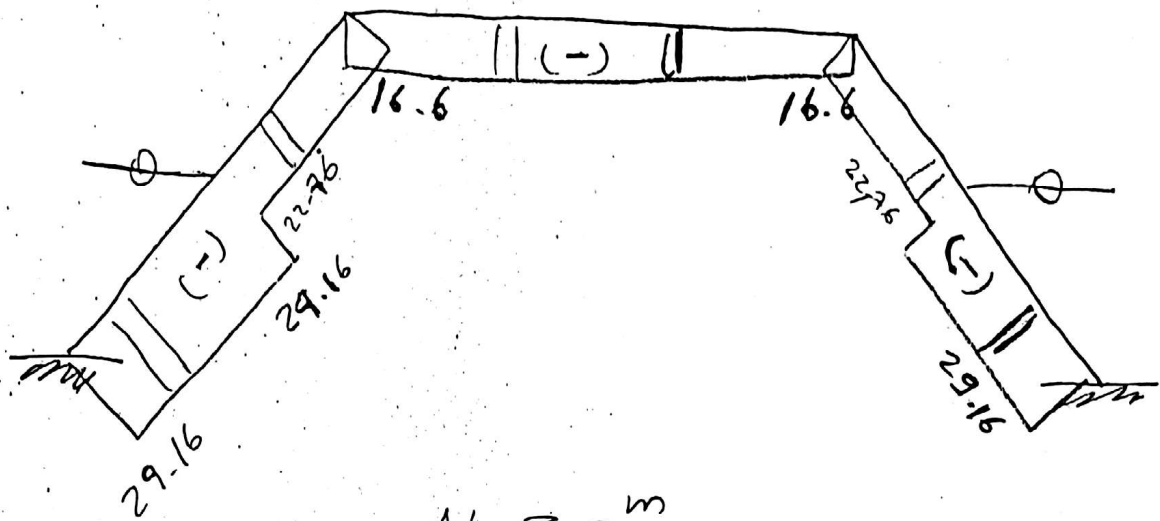
(22)

$$\begin{array}{c} 5 \\ \theta \\ 3 \end{array} \quad \begin{array}{c} 4 \end{array}$$

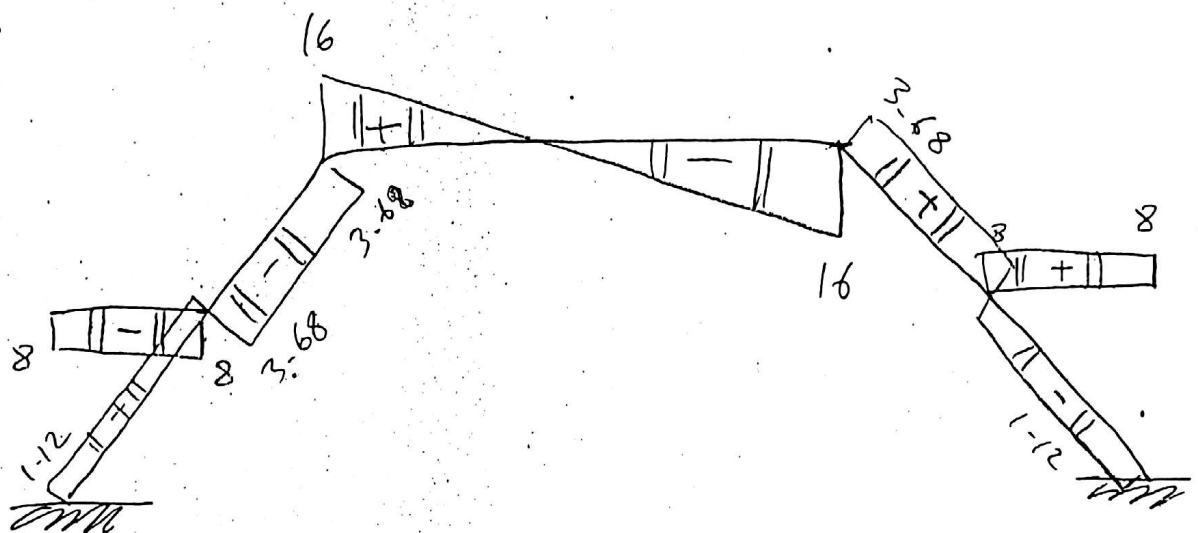
$$\sin \theta = 0.8 = \frac{4}{5}$$

$$\cos \theta = 0.6 = \frac{3}{5}$$



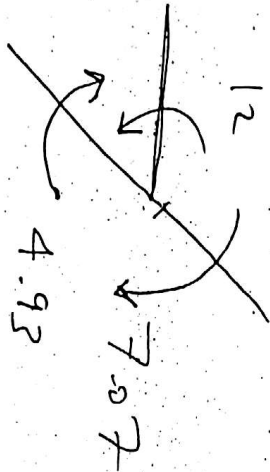


N. F. D^m



S. F. D^m

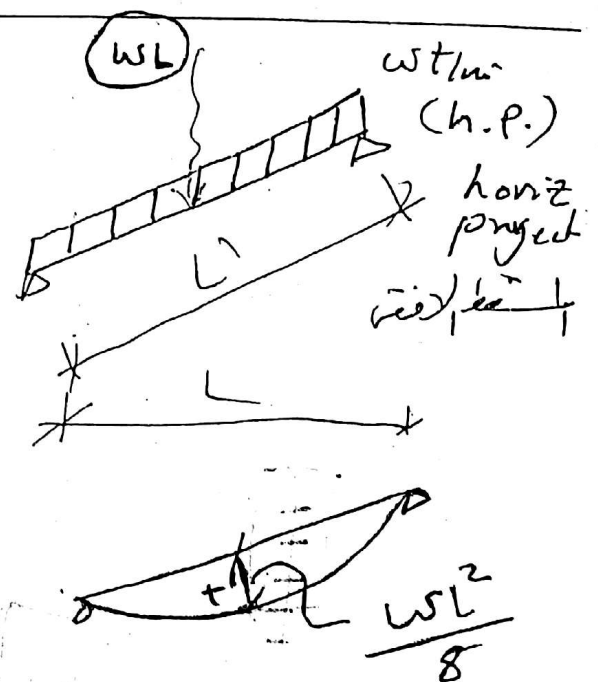
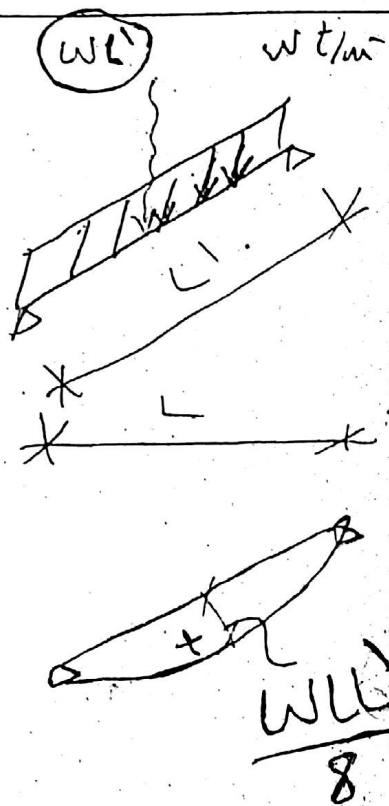
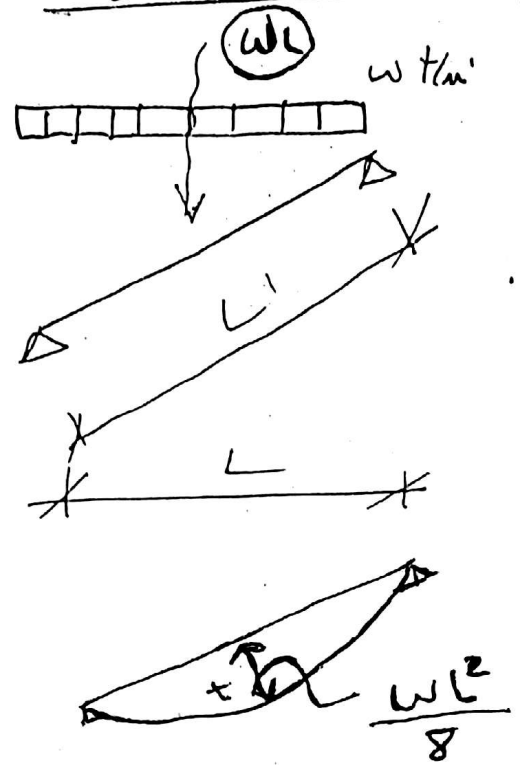
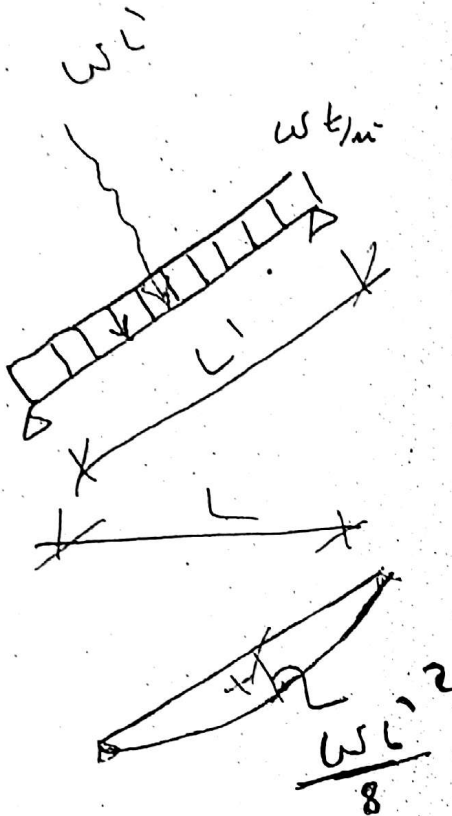
24



1

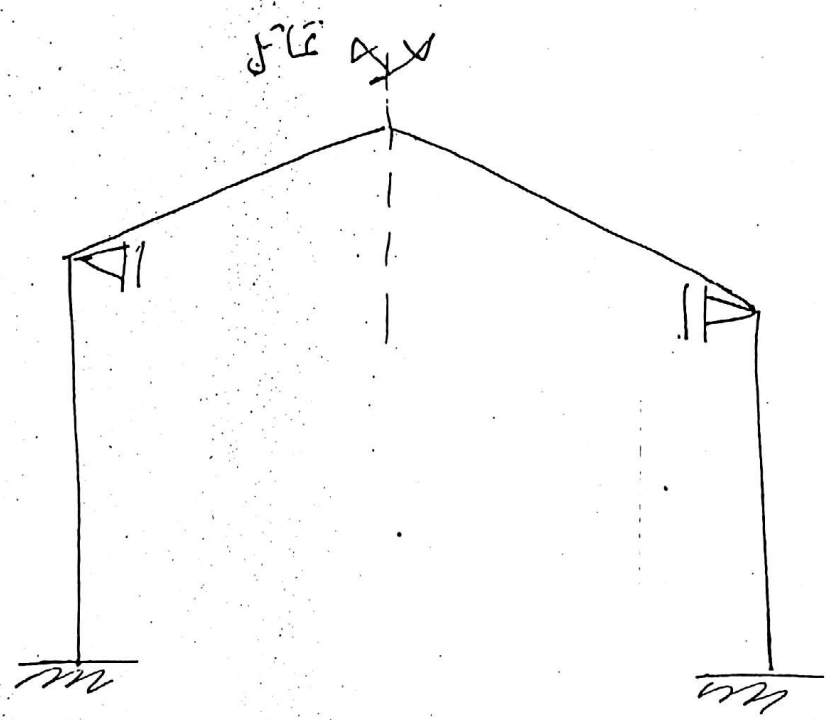
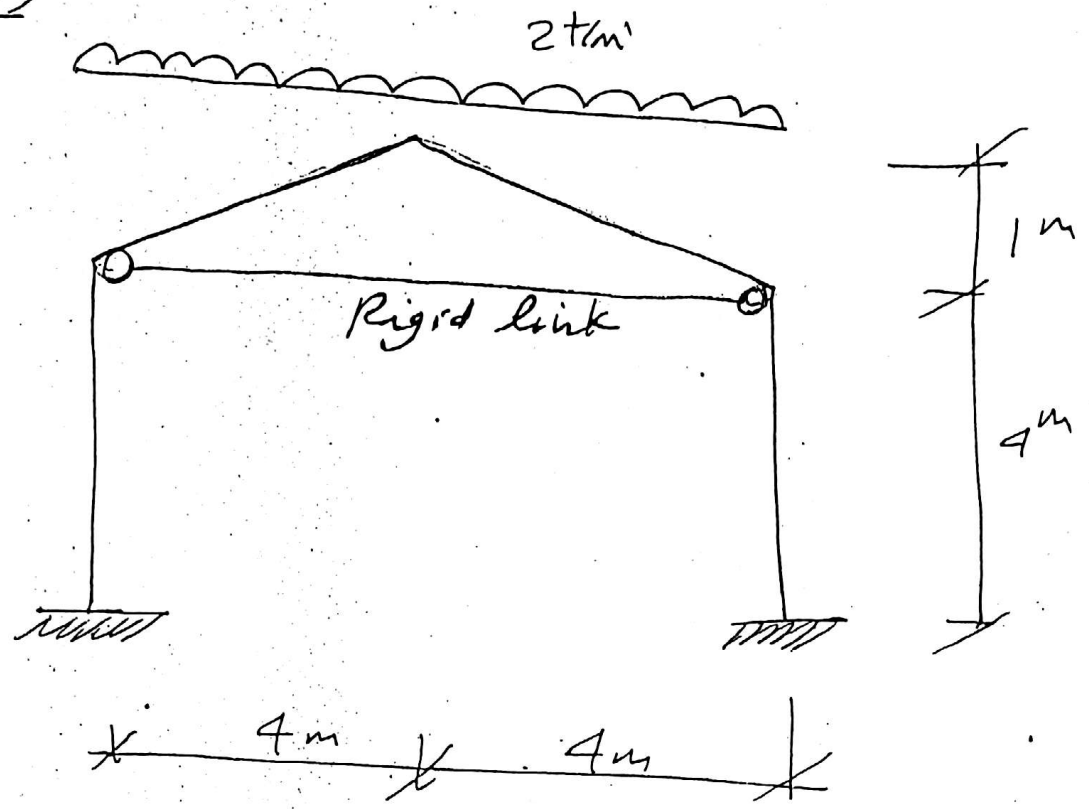
Scanned by CamScanner

حالات بی مقعر :-

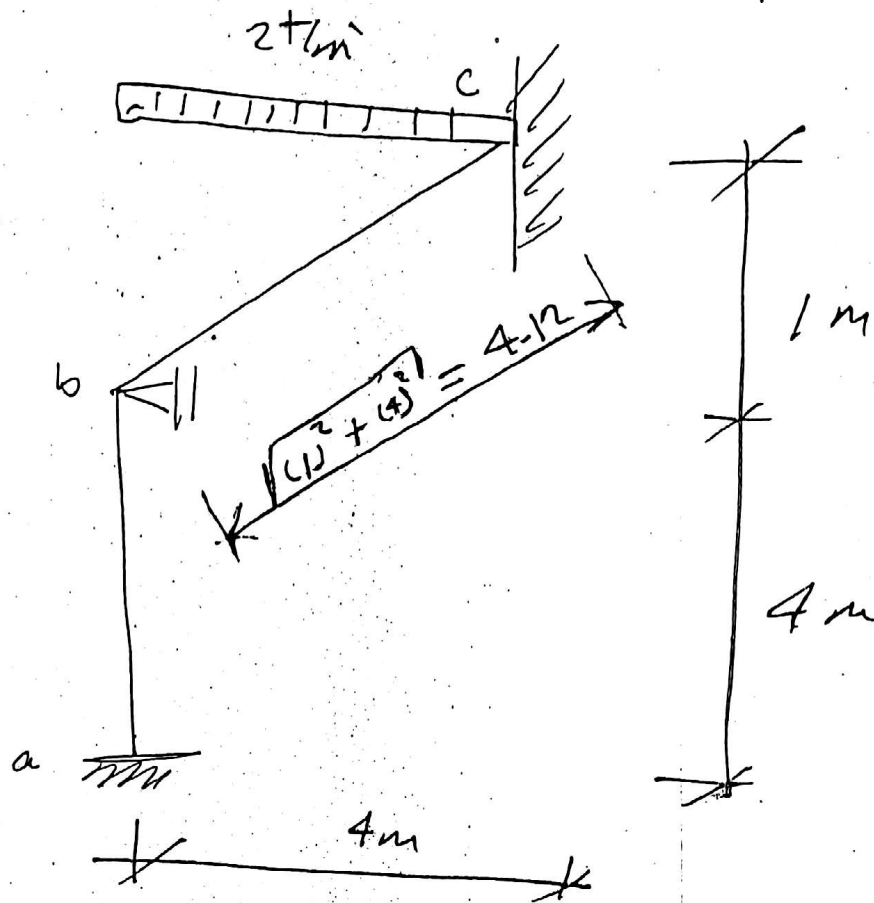


26 * انتیغاتی و اکر

Ex. (8):-
Const. (I)

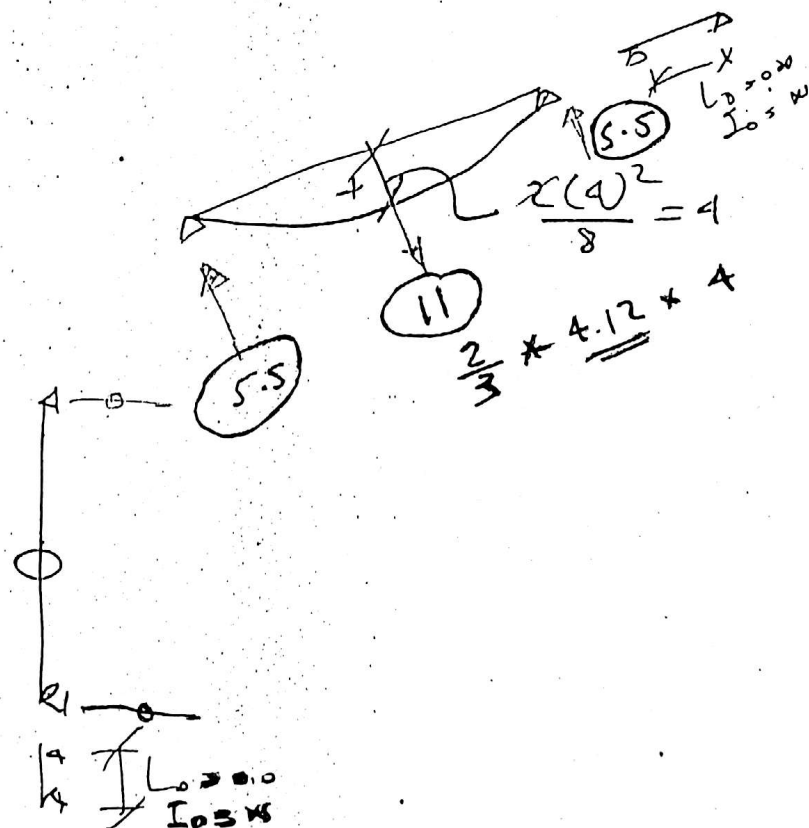


*** إذا مركز الماشل Joint يكون
 Fixed



M_a, M_b, M_c

المبصر:



Apply 3.M-eqn at (a) :-

$$0.0 + 2M_a(0.0 + 4) + M_b(4)$$

$$= -6(0.0 + 0.0)$$

$$2M_a + M_b = 0.0 \quad \text{--- (1)}$$

Apply 3.M-eqn at (b) :-

$$M_a(4) + 2M_b(4 + 4 \cdot 12) + M_c(4 \cdot 12)$$

$$= -6(0 + 5.5)$$

$$4M_a + 16.24M_b + 4.12M_c$$

$$= -33 \quad \text{--- (2)}$$

Apply 3.M-eqn at (c) :-

$$M_b(4 \cdot 12) + 2M_c(4 \cdot 12 + 0) + 0.0$$

$$= -6(5.5 + 0)$$

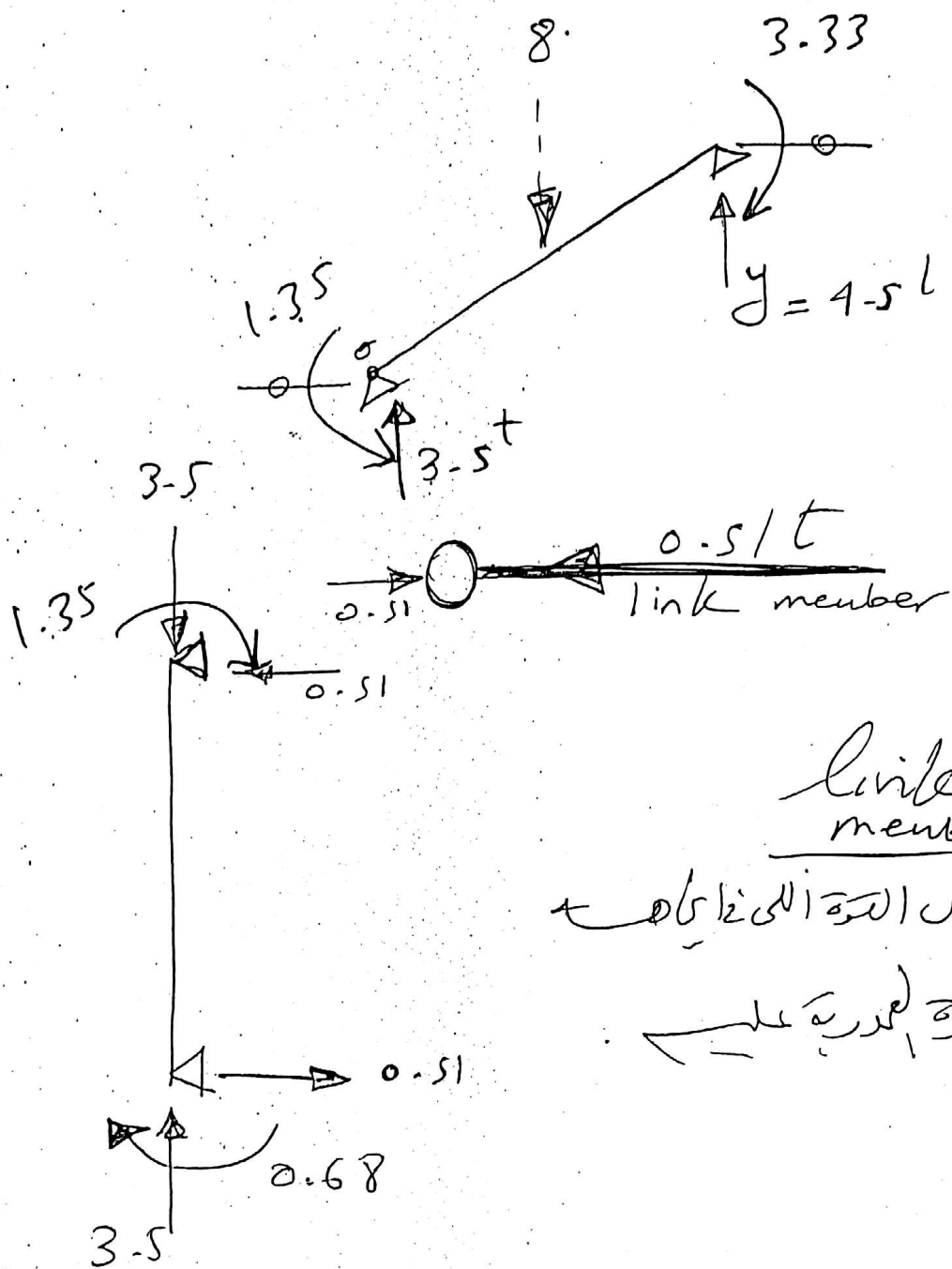
$$4.12M_b + 8.24M_c = -33$$

--- (3)

Solve (1), (2), (3)

$$M_a = 0.68 \text{ mt}, M_b = -1.35 \text{ mt}, M_c = -3.33 \text{ mt}$$

(29)



link member

لا يغيرش القوة الى الخواص
فهي القوة المحركة على

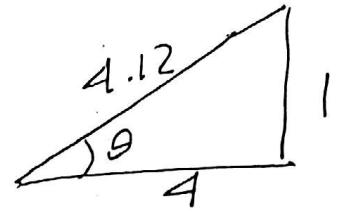
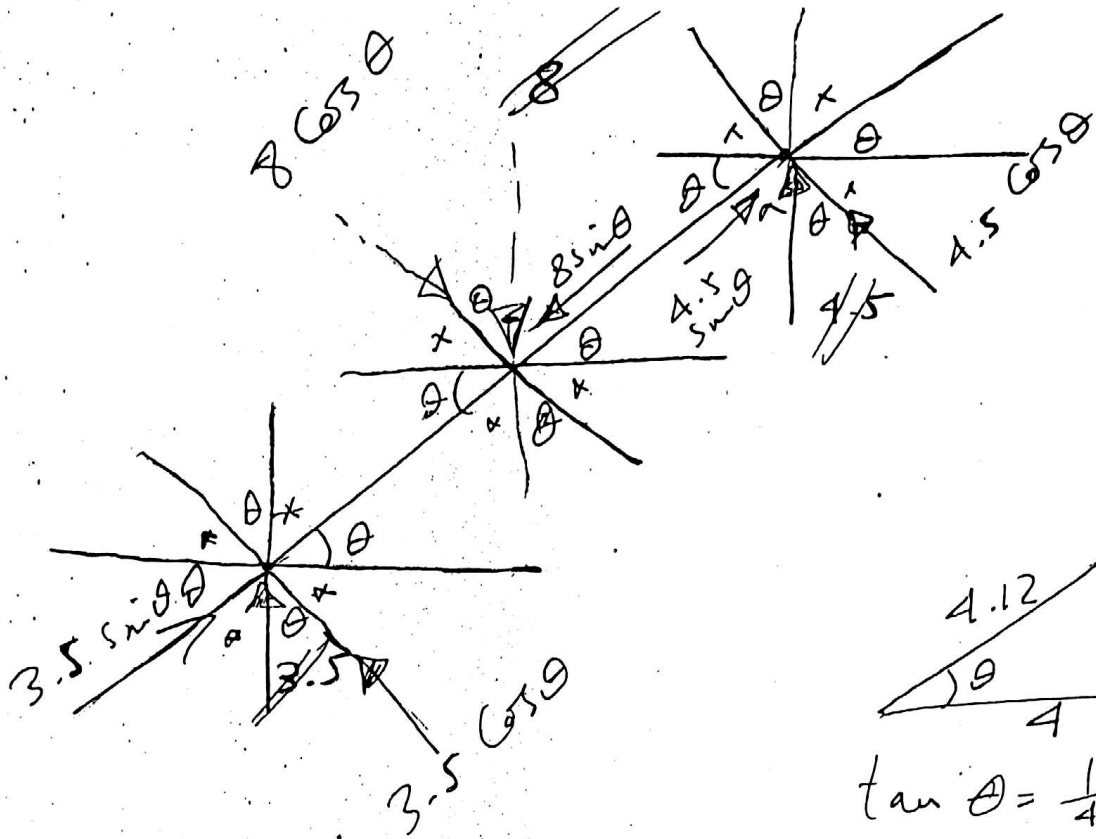
$$\sum M_o = 0.0$$

$$+ 8 \times 2 + 3.33 - 1.35$$

$$- y \times 4 = 0.0$$

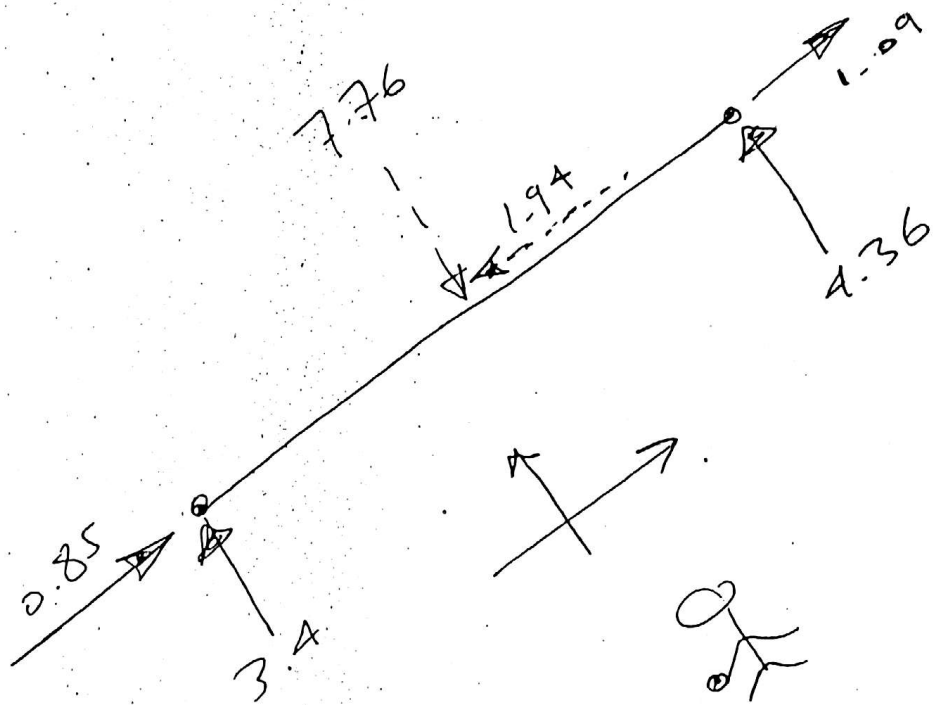
$$y = 4.5 \text{ m}$$

3a



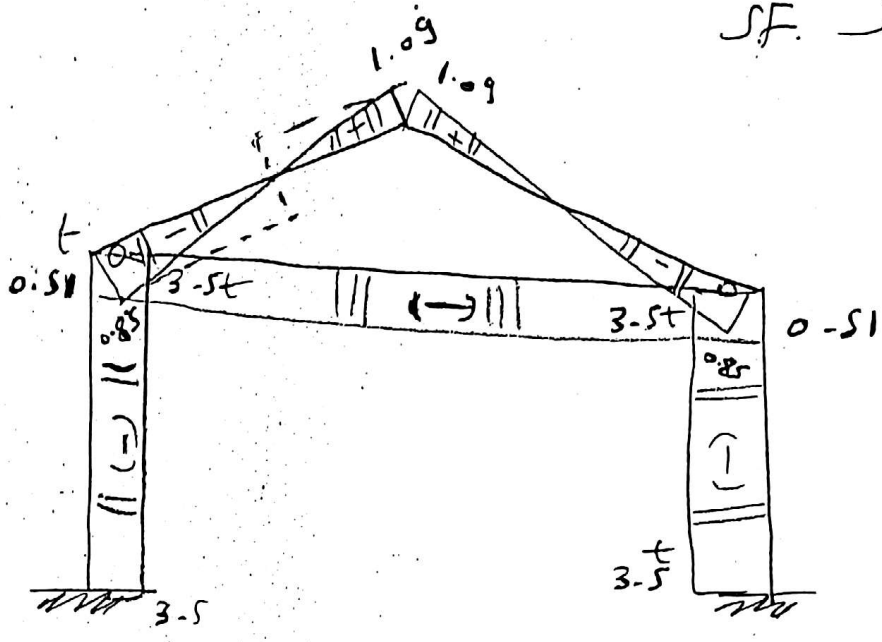
$$\tan \theta = \frac{1}{4}$$

$$\theta = 14.04^\circ$$

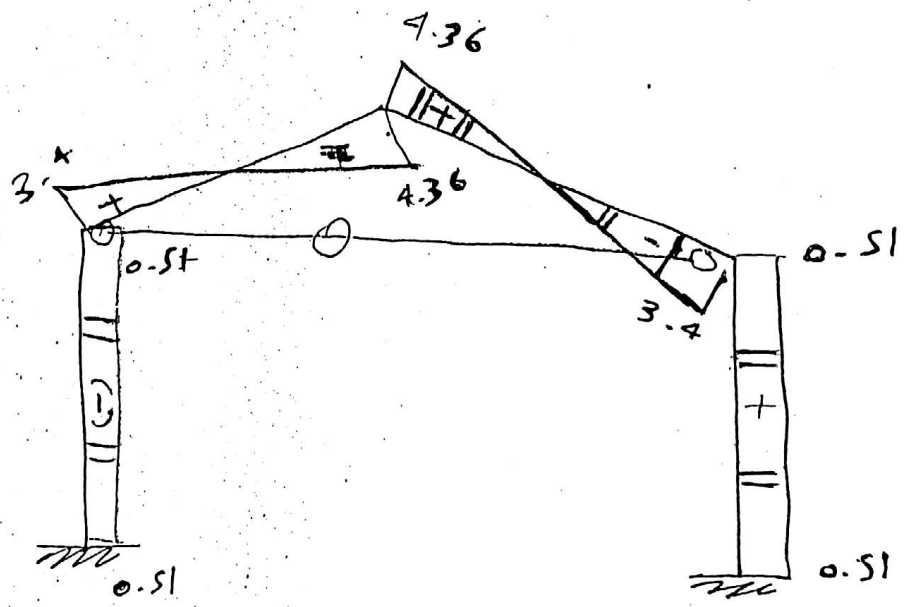


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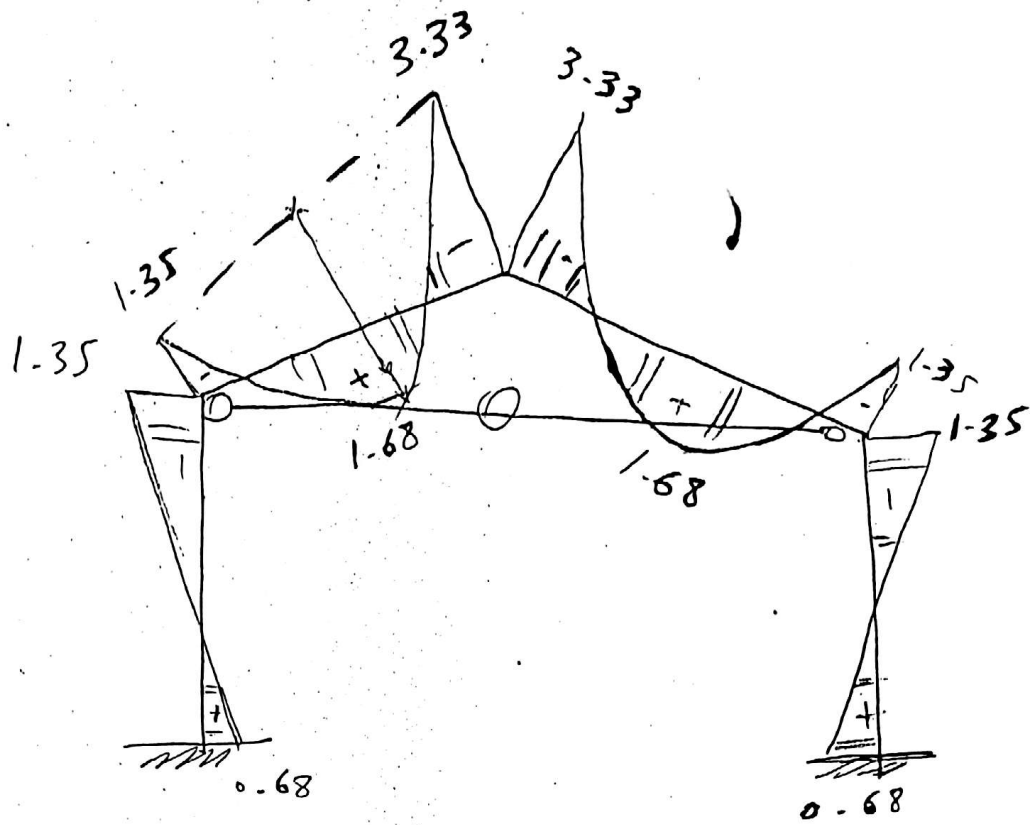
ملاحظة: على الـ NF الشاغور في صرر حاملة
 الـ SF.



N.F.D^m



S.F.D^m



B.M.D^m

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