الترم الأول سلسلة العبدين

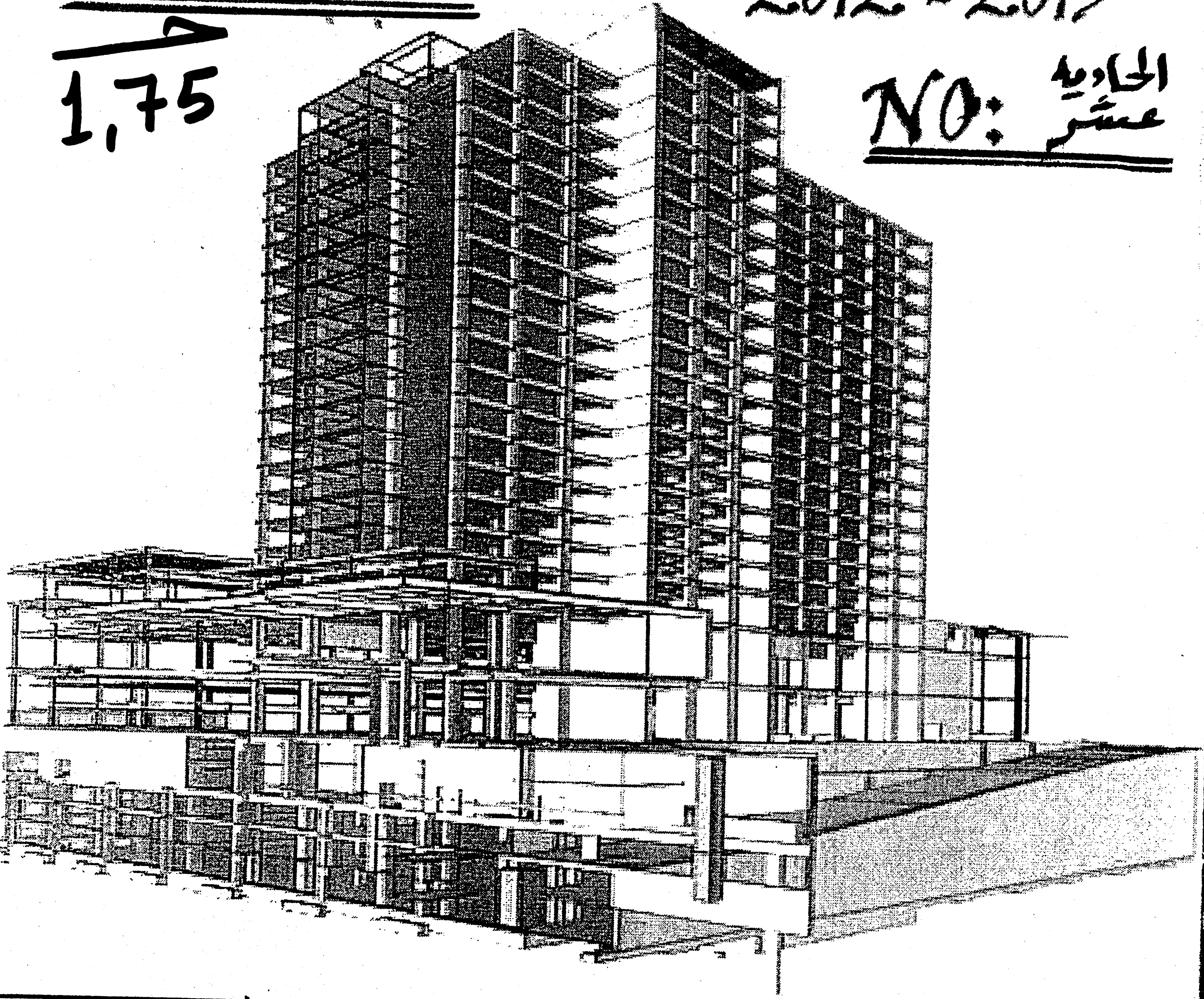
1st Year
Theory Of Structures

امتحانات وأفكار
على Trusses

ج 1,75

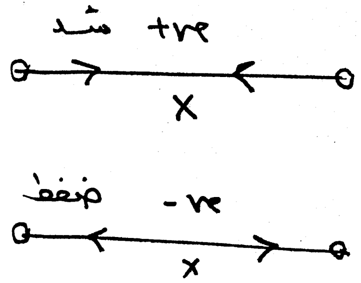
2012 - 2013

NO: الحادية عشر

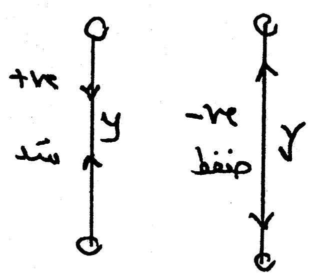


تلخيص عام لطرق ايجاد القوى في أضلاع الـ (truss)	(I,II)
EX(1) ← مع مثالين امتحان متشابهين	(1→4)
EX(2) ← لاحظ كيفية ايجاد (٩،٢،٩) والسبب	(5,6)
EX(3) ← Term(2003 - Term(2008 ← EX(4)	(7→10)
EX(5) ← Term(1998) + مثال مشابه لـ (2008)	(11→13)
أمثلة لامتحانات سابقة مع نفس فكرة الحل (1→8)	(14→17)
أفكار هامة ومتنوعة	(18→19)

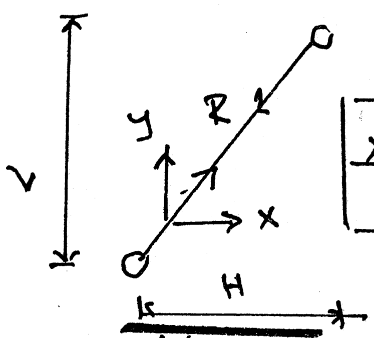
(١) فروض القوى - الأضلاع الصفرية



ضلع أفقي في (truss)

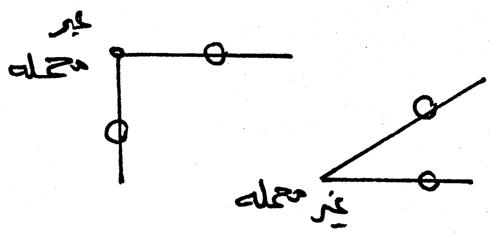


ضلع رأسي

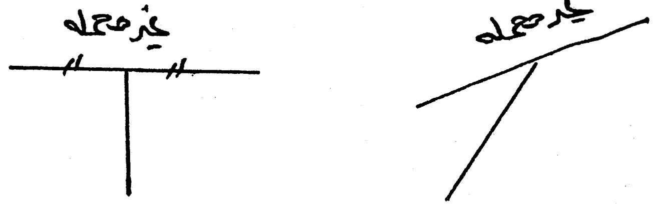


$$\boxed{\frac{X}{y} = \frac{H}{V}}$$

ضلع مائل



(V joint)

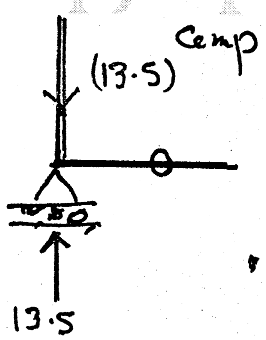


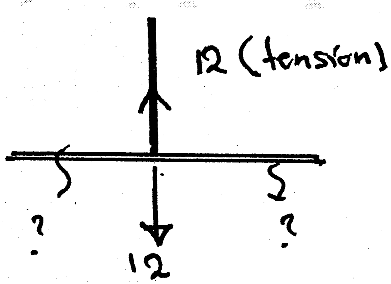
(T joint)

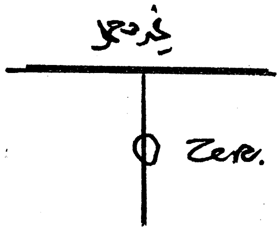
(٢) الحل الجبري analytically

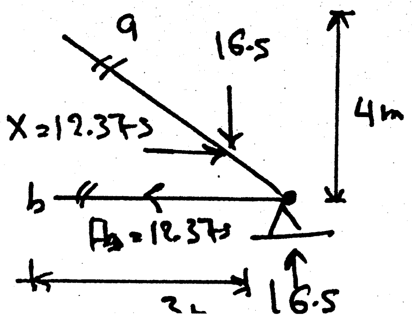
(م) اتزان الوصلات (joint)

* للأضلاع الرأسية   * الأضلاع عند الأطراف









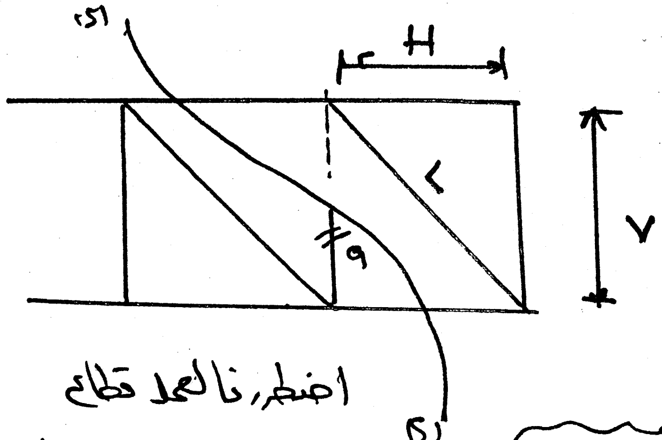
* $\Sigma Y = 0.0$ $\therefore Y_a = 16.5 \downarrow$

$\because$ الميل $\frac{16.5}{X} = \frac{4}{3}$ $\therefore X = 12.375 \rightarrow$

* $\Sigma X = 0.0$ $\therefore F_b = 12.375\ t \leftarrow$ (tension)

(ب) قطاع $\Sigma Y = 0.0$

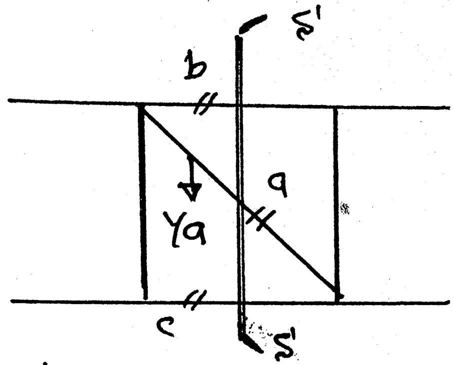
* للأضلاع الرأسيه - المائله



اضطررنا نعمل قطاع مائل لغير ضلع واحد رأسي له (Y) فقط

ضلع رأسي

* تؤخذ ΣY من ناحيه واحده فقط



(b, c) ليس لهم (Y) لذلك نأخذ $\Sigma Y = 0.0$

ضلع مائل

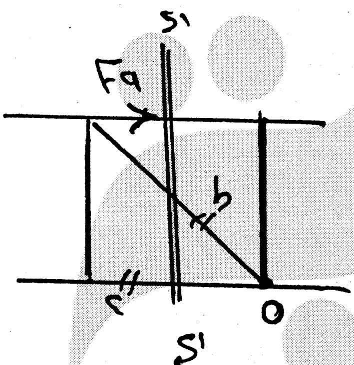
$$\boxed{\frac{X}{H} = \frac{Y}{V} = \frac{F}{L}}$$

أي ضلع مائل

(جـ) قطاع $\Sigma M = 0.0$

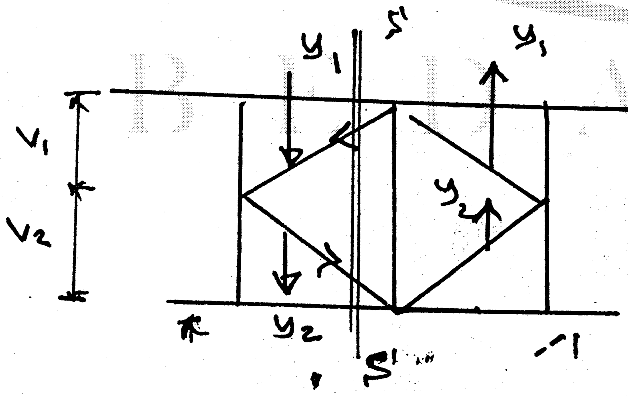
* الأضلاع السفليه والعلويه غالباً الأفقيه

* تأخذ حول تلاقي الأضلاع الأخرى الغير مطلوب القوه فيها مثل (b, c)



Sec (S-S1), $\Sigma M_0 = 0.0$

(د) ملاحظة (K truss)



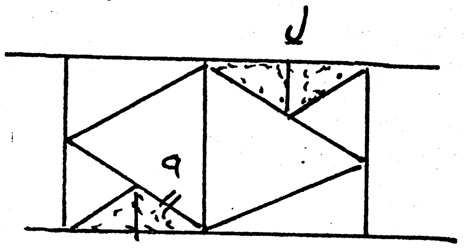
* (y_1), (y_2) نفس الاتجاه $\Sigma Y = 0.0$

1) $\Sigma Y = 0.0$ left or right

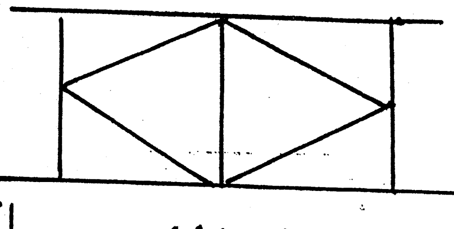
2) $\frac{y_1}{y_2} = \frac{V_1}{V_2}$

(هـ) ملاحظة Subdivided

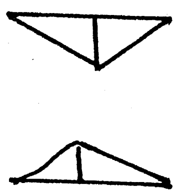
لو مش محمل ملوش لازمه



$=$



(Main)



(secondary)

$$\boxed{F_a = (F_a)_{main} + f_a\,(second)}$$

4. Find analytically the forces in the marked members a, b, c, d, e, f, and g in the truss shown in *Fig.4*.

(20 marks)

1

EX(1)

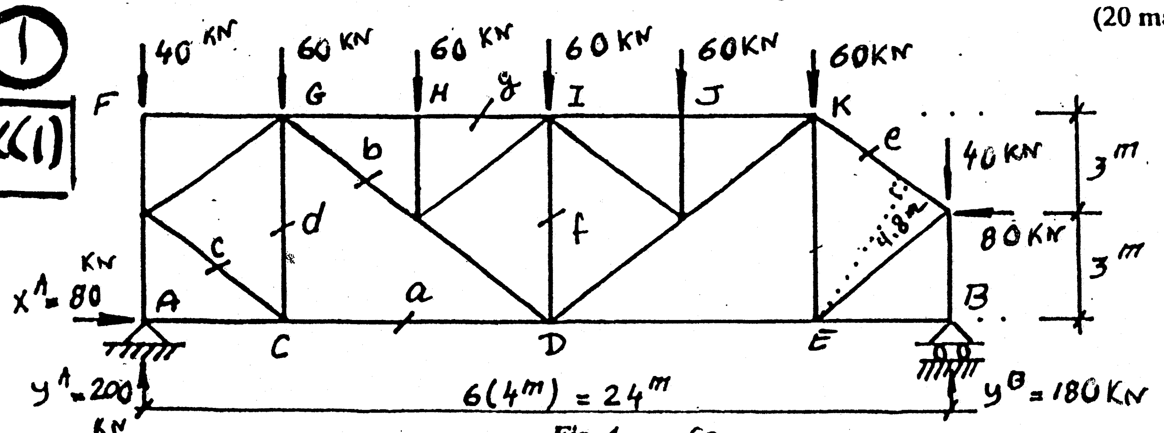
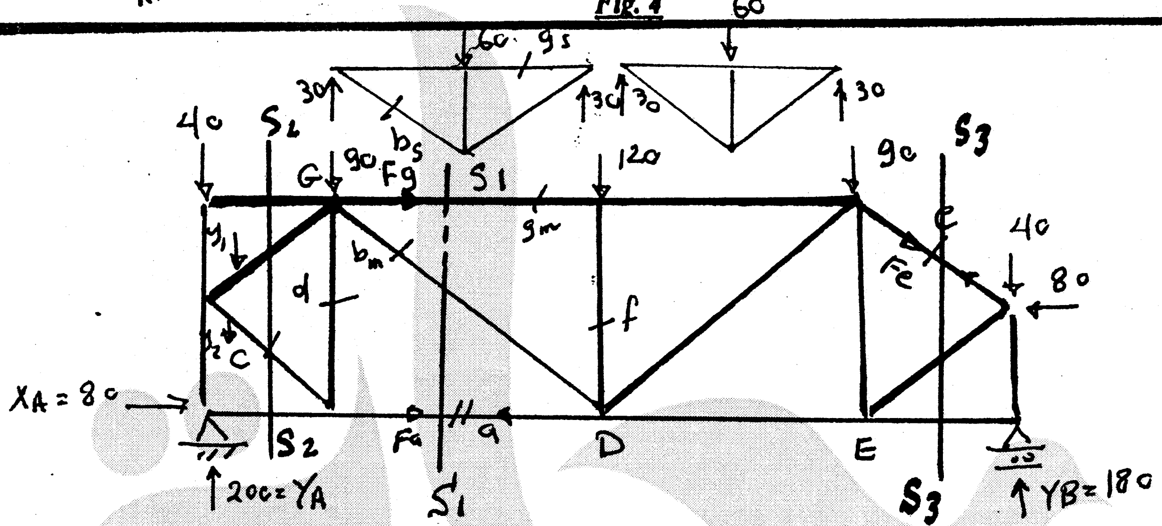


Fig. 4



F_a (Sec (S_1-S_1) and ΣM_G) = 0 from left)

$200(4) - 80(6) - 40(4) - F_a(6) = 0$ ∴ $F_a = 26.67$ tension

F_b (Sec (S_1-S_1) and $\Sigma Y = 0$ from left) main

$200 - 40 - 90 - y = 0$ ∴ $y = 70$ بالتالي $X = 70\left(\frac{8}{6}\right) = 9.33$ ∴ $F_{b\,main} = 116.67$

30, 40, 30, $F_{b\,sub} = 50$

∴ $(F_b) = (F_b)_m + (F_b)_{sub}$ كلية

$= 116.67 + 50 = 156.67$ KN $= F_b$ tension

F_c (Sec (S_2-S_2) and $\Sigma y = 0$ from left)

$200 - 40 - y_1 - y_2 = 0$ ∴ $y_1 + y_2 = 160$

$\frac{y_1}{y_2} = \frac{3}{3}$ ∴ $y_1 = y_2$ ∴ $y_1 = 80$, $y_2 = 80$

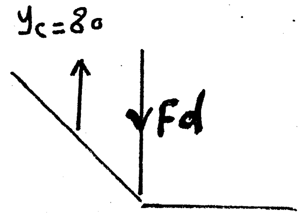
∴ $y_c = 80$

∴ $x_c = \frac{80 \times 4}{3} = 106.67$

∴ $F_c = 133.33$ tension

Fd ($\Sigma y = 0$ for joint (c))

2



$80 - Fd = 0$

$\therefore Fd = 80$ Comp

Fe (Sec ($S_3 - S_3$) and $\Sigma M_E = 0$ from Right)

$180(4) + 80(3) - 40(4) + Fe(4.81) = 0$

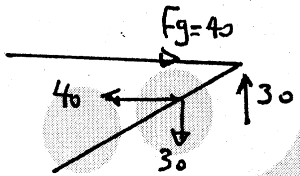
لبعد عمودي معطى

$\therefore Fe = 166.67$ Comp

FG (Sec ($S_1 - S_1$) and $\Sigma M_D = 0$ from left)

$200(12) - 40(12) - 90(8) + Fg_{main}(6) = 0$

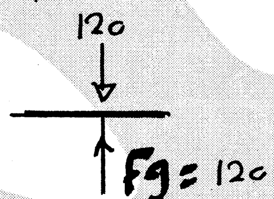
$\therefore Fg_{main} = 200$ ten



$Fg_{sub} = -40$

$\therefore Fg = 200 - 40 = 160$ tension

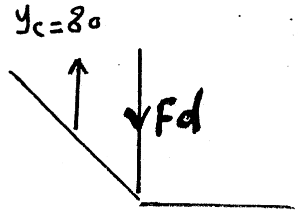
Ff (Joint (I) , $\Sigma y = 0.0$)



Fd = 120 Comp

Force	Value	type
Fa	26.67	tension
Fb	156.67	tension
Fc	133.33	tension
Fd	80	Comp.
Fe	166.67	Comp.
Ff	120	Comp
Fg	200 - 40 = 160	tension

Fd ($\Sigma y = 0$ for joint (c)) 2



$80 - Fd = 0$ $\therefore Fd = 80$ Comp

Fe (Sec (S_3-S_3) and $\sum_E M = 0$ from Right)

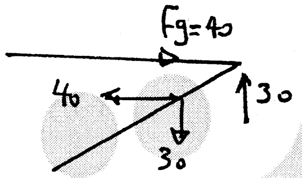
$180(4) + 80(3) - 40(4) + Fe(4.81) = 0$

بعد عمودي معطى

$\therefore Fe = 166.67$ Comp

FG (Sec (S_1-S_1) and $\Sigma M_D = 0$ from left)

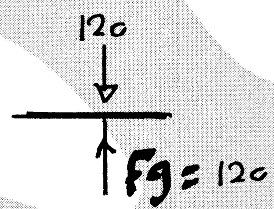
$200(12) - 40(12) - 90(8) + Fg_{main}(6) = 0$ $\therefore Fg_{main} = 200$ ten



$Fg_{sub} = -40$

$\therefore Fg = 200 - 40 = 160$ tension

Ff (Joint (I) , $\Sigma y = 0.0$)



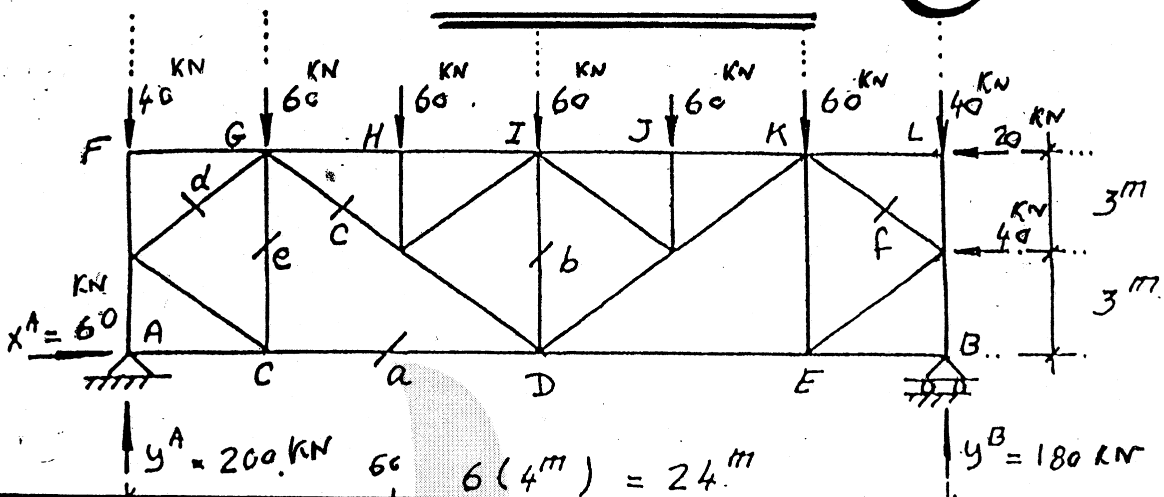
$Fd = 120$ Comp

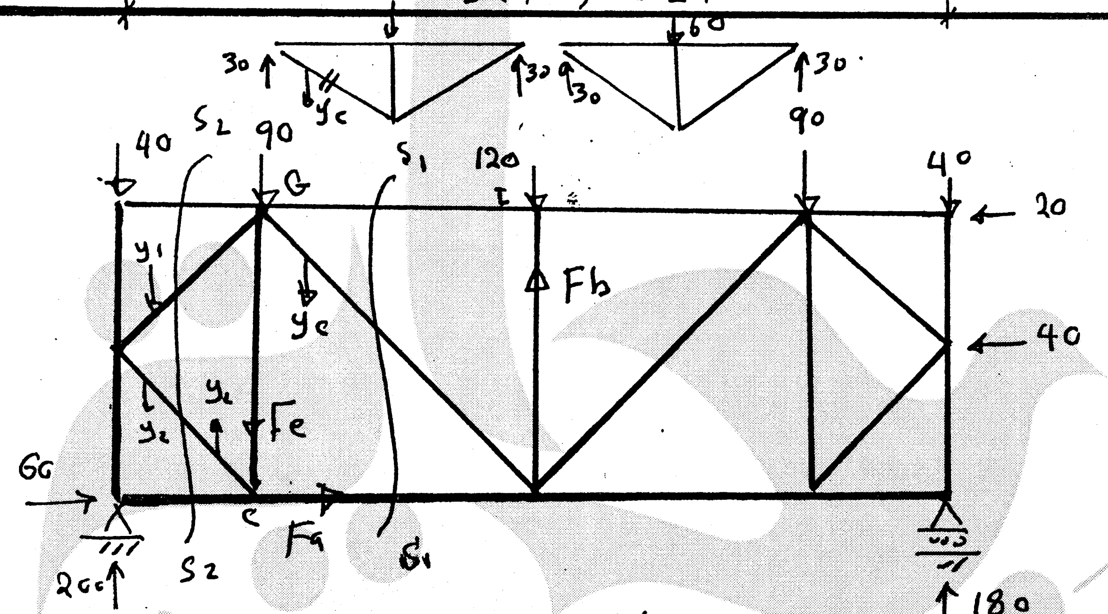
Force	value	type
Fa	26.67	tension
Fb	156.67	tension
Fc	133.33	tension
Fd	80	Comp.
Fe	166.67	Comp.
Ff	120	Comp
Fg	200 - 40 = 160	tension

Find ***analytically*** the forces in the indicated members, a, b, c, d, e, and f in the *Truss* shown in *Fig.4*.

(مثال مشابه) 3

(20Marks)





Fa) Sec (S_1-S_1) and $\Sigma M_G = 0.0 \xrightarrow{\text{left}} 200(4) - 40(4) - Fa(6) = 0$

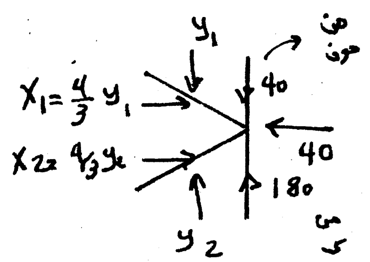
Fb) Joint (I), $\Sigma y = 0.0$ ∴ $Fb = 120$ $y_c = 30$ sub main ∴ $y_c = 70$

Fc) Sec (S_1-S_1) and $\Sigma y = 0.0 \xrightarrow{\text{left}} 200 - 40 - 90 - y_c = 0$ $\quad X_c = \frac{70(8)}{6}$

Fd) Sec (S_2-S_2) and $\Sigma y = 0.0 \xrightarrow{\text{left}}$ $y_1 + y_2 + 40 = 200$, $\frac{y_1}{y_2} = \frac{3}{3}$

Fe) Joint (e) and $\Sigma y = 0.0 \longrightarrow Fe = -y_2$, $X_1 = \frac{4}{3} y_1$, $X_2 = \frac{4}{3} y_2$

$y_1 + 40 - y_2 - 180 = 0$ $\boxed{1}$

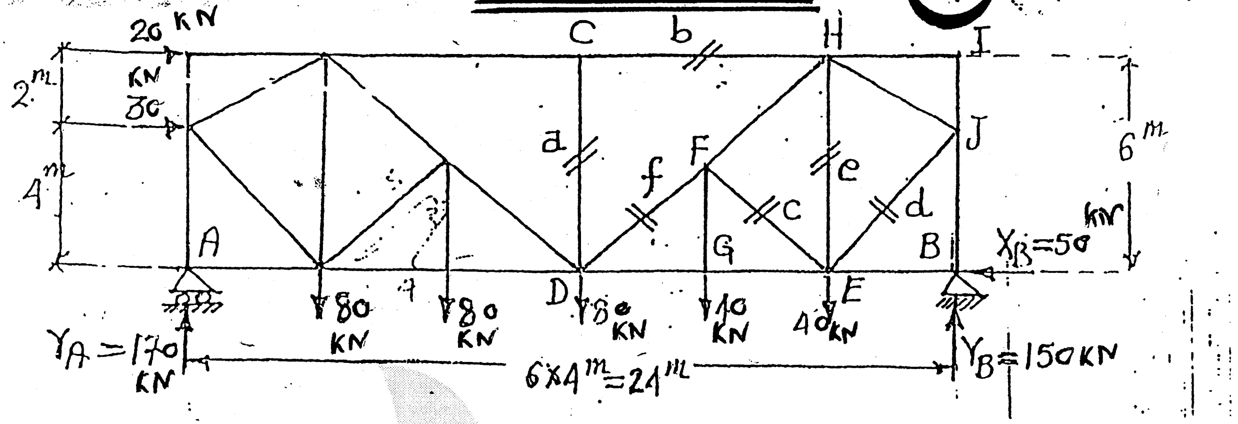


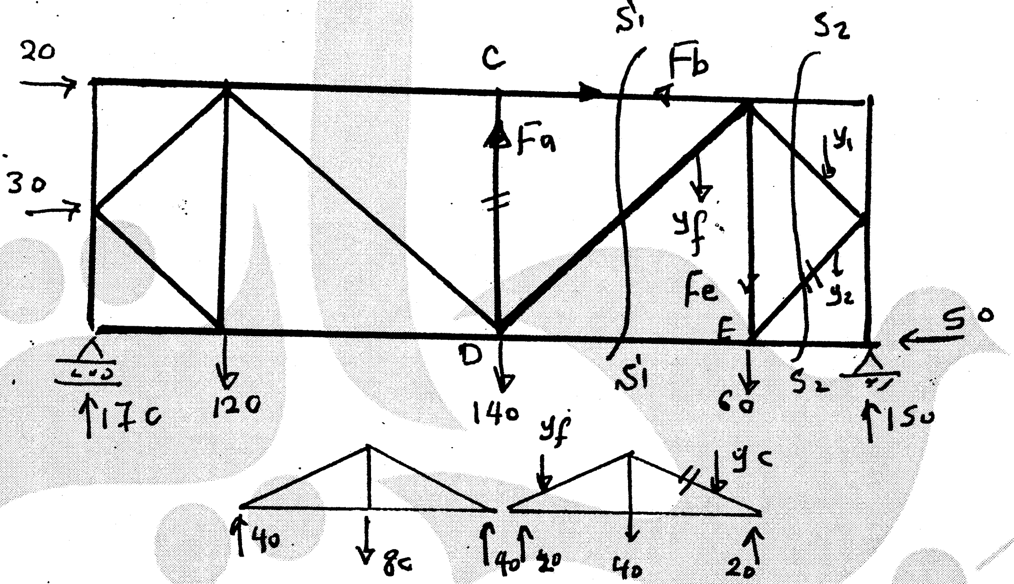
Ff) K truss لأنه عضو صفر

$\frac{4}{3} y_1 + \frac{4}{3} y_2 - 40 = 0$ $\boxed{2}$

5-Find analytically the forces in the members a, b, c, d, e, and f (indicated by //) in the truss shown in Fig.(5).

(امثال مسـايه) ④ (20 marks)





Fa) Joint (C), $\Sigma y = 0.0$ ∴ $F_a = $ Zero (حالة خاصة)

Fb) Sec($S_1 - S_1$) and $\Sigma M_D = 0.0$ right $60(8) - 150(12) - F_b(6) = 0$

Fc) from sub only joint $\Sigma y = 0.0$ ∴ $y_c = 20 \downarrow$, $x_c = 20\left(\frac{4}{3}\right)$

Fd) Sec ($S_2 - S_2$) K truss, $\Sigma y = 0$ $y_1 + y_2 = 150$, $\frac{y_1}{y_2} = \frac{2}{4}$

Fe) Joint (E) $\Sigma y = 0.0$ ∴ $F_e = -y_2$ in member Fd

Ff)
- main Sec($S_1 - S_1$) and $\Sigma y = 0$ right $150 - 60 - y_f = 0$, $x_f = \frac{y_f(8)}{6}$
- sub $\Sigma y = 0.0$ $y_f = 20 \downarrow$ $x_f = 20 \times \left(\frac{4}{3}\right) = ✓$

EX(2)

5

Fig. (3)- check analytically the forces in the members indicated by (//)"

(25 marks)

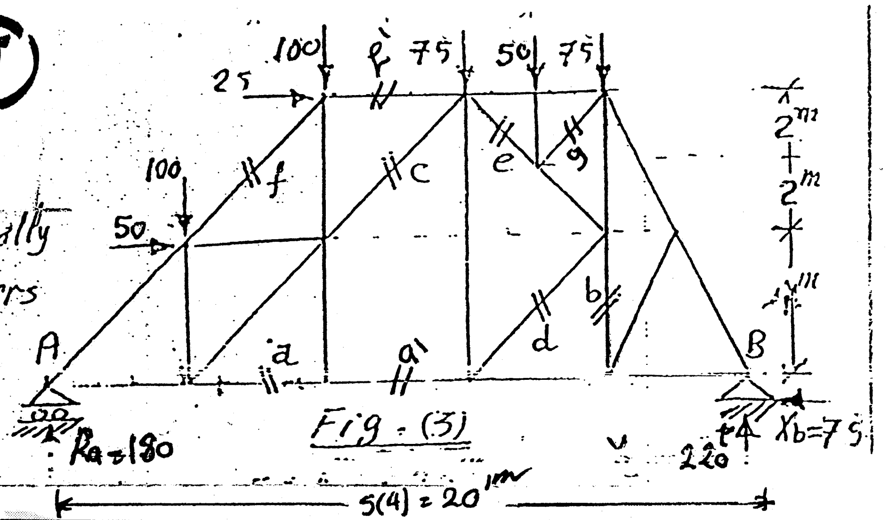
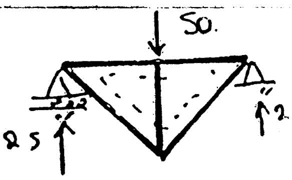
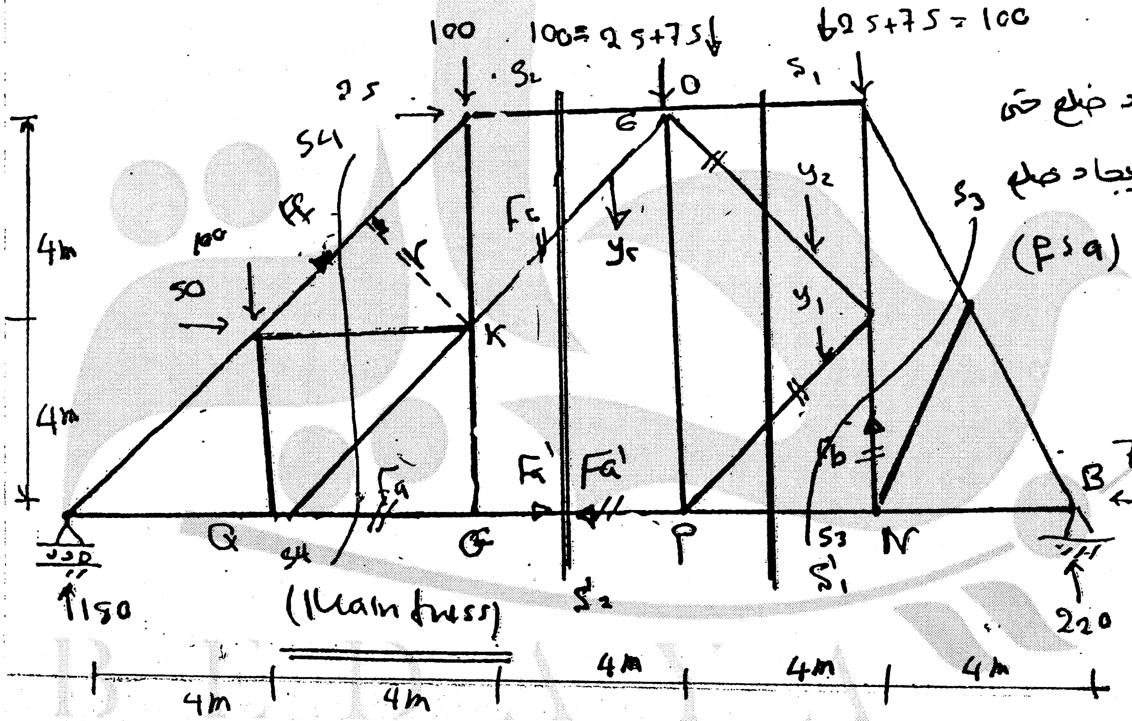


Fig. (3)

(*) Find The forces in Marked members



Subdevided is



(Main truss)

*عكس ايجاد ضلع حتى
نتحقق من ايجاد ضلع
مطلوب مثل (F و g)

(Fa') Sec ($S_2 - S'_2$) and $\Sigma M_O = 0.0$ (right)

$100(4) - 220(8) + 75(8) - F_{a'}(8) = 0$ $\therefore F_{a'} = 95$ KN tension

$F_a \Rightarrow$ from joint (G) $\therefore F_a = +95$ KN $\Sigma X = 0$

Fa G Fa'

(Fb) Sec ($S_3 - S_3$) and $\Sigma M_B = 0.0$ right

$220(0) + 75(0) + F_b(4) = 0.0$ $\therefore F_b = \text{zero}$

(Fc) Sec (S_3 - S_3) and $\Sigma y = 0.0$ right ⑥

$y_c + 100 + 100 - 220 = 0 \quad \therefore y_c = 20 \quad \therefore x_c = 20$

$\therefore F_c = 20\sqrt{2}$ tension

(Fd) K truss Sec (S_1 - S_1) and $\Sigma y = 0$ right

$y_1 + y_2 + 100 - 220 = 0 \qquad y_1 / y_2 = \frac{4}{4} \qquad \therefore y_1 = 60\,kN, \; x_1 = 60\,kN$

$F_d = 60\sqrt{2}$ tension

(Fe) K truss, subdivided Sec (S_1 - S_1) and $\Sigma y = 0$

$(F_e)_{main} = F_d = 60\sqrt{2}$ Comp

$(F_e)_{sub} \Rightarrow \Sigma y = 0 \quad \therefore y_e = 25, \; x_e = 25 \quad \therefore F_e = 25\sqrt{2}$ tension

$\therefore F_e = (F_e)_{main} + F_e(sub)$

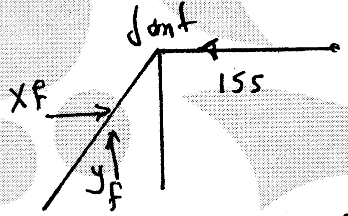
$= -60\sqrt{2} + 25\sqrt{2} = 35\sqrt{2}$

$\therefore F_e = 25\sqrt{2}$ ten

(Ff') Sec (S_2 - S_2) and $\Sigma M_Q = 0$ (left)

$180(8) - 100(4) + 50(4) + F_{f'}(8) = 0 \quad \therefore F_{f'} = 155\,kN$ Comp

to get (f) →



$X_f = 155$

$y_f = 155\left(\frac{8}{8}\right) = 155$

$\therefore F_f = 155\sqrt{2}$ tension

حل آخر كان علي اخذ قطاع يقطع (F) وبمعلوميه (Fa) خاخذ عزم عند (K)
لايجاد (Ff) كالتالي

(Ff) Section (S_4 - S_4) and $\Sigma M_K = 0.0$ left

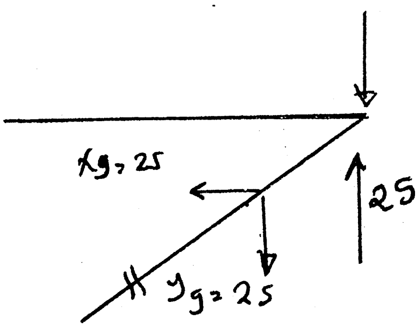
$180(8) - 100(4) + F_f(r) = 0.0$

بالقياس

(Fg) Subdevided only and $\Sigma Y = 0.0$

$y_g = 25, \; X_G = 25$

$\therefore F_g = 25\sqrt{2}$ ten



5- Find analytically the forces in the members a, b, c, d, e, f and g (indicated by //) in the truss shown in Fig. (5).

Ex (3) (7)

(21 marks)

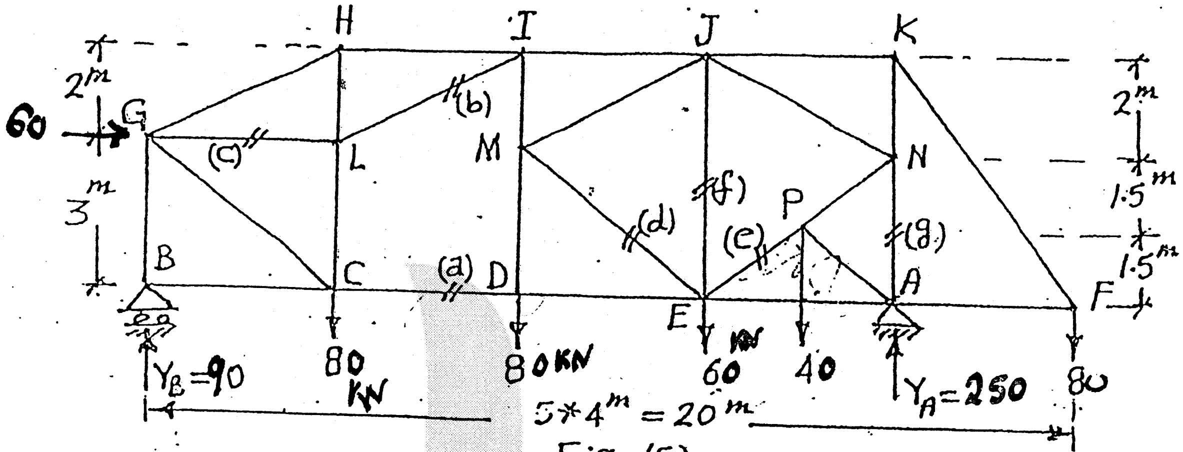
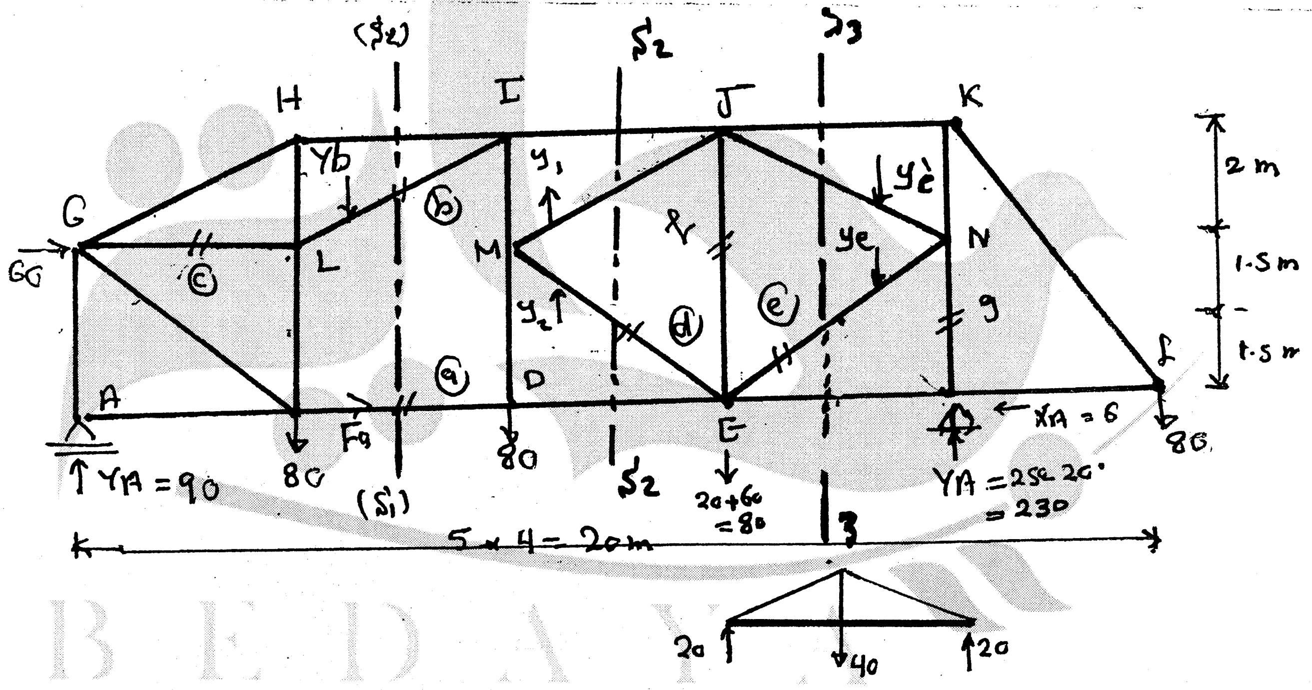


Fig. (5)



(Fa) Sec (S_1 - S_1) and $\Sigma M_I = 0.0$ (left)

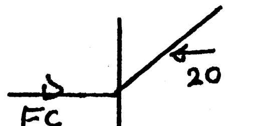
$Fa(5) + 80(4) - 90(8) + 60(2) = 0$ $\therefore$ **Fa = 56 tension**

(Fb) Sec (S_1 - S_1) and $\Sigma y = 0.0$

$Yb = 10$ Comp

$X = \frac{4}{2}(10) = 20$ $\therefore$ **Fb = 22.36 Comp**

(Fc) Joint (L) and $\Sigma X = 0.0$



$Fc - 20 = 0$

$\therefore$ **Fc = 20 Comp**

(Fd) Sec($S_2 - S_2$) and $\Sigma y = 0$ K truss

8

$y_1 + y_2 = 160 - 90 = 70 \rightarrow ①$

$y_1 / y_2 = 4/3 \rightarrow ②$

ملد $\therefore y_2 = y_d = 42$ kN $\quad X_1 = \frac{4}{3}(42)$

$\therefore F_d = 70$ kN Comp

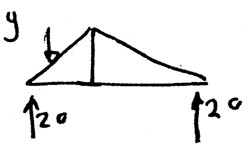
(Fe) Sec ($S_3 - S_3$) and $\Sigma y = 0$ K truss (main) right

$y\grave{e} + y_e = 230 - 80 = 150 \rightarrow ①$ $\quad \therefore y_e = 90$

$y\acute{e} / y_e = 4/3 \rightarrow ②$ $\quad$ ملد $\quad \therefore X_e = 90(4/3)$

$\therefore F_{e\,main} = 150$ kN ten

Sub



$y = 20$

$X = 20 \times \frac{2}{1.5}$

$\therefore F_{e\,sub} = 33.3$ Comp

$\therefore (F_e) = F_{e\,main} + F_{e\,sub}$

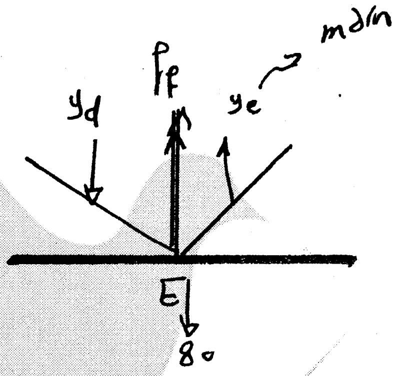
$= 150 - 33.3 = 116.7$

$\therefore F_e = 116.7$ tension

(Ff) joint (E) and $\Sigma y = 0$

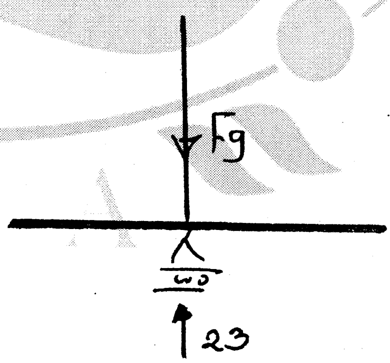
$F_f + (-y_d) + y_e - 80 = 0$

$F_f - 42 + 90 - 80 = 0$ $\quad \therefore F_f = 32$ ten.



(Fg) joint (A) and $\Sigma y = 0.0$

$F_g - 23 = 0$ $\quad \therefore F_g = 23$ Comp



member	Fa	Fb	Fc	Fd	Fe	Ff	Fg
force	56	22.36	20	70	116.7	32	23
type	tension	Comp	Comp	Comp	tension	ten.	Comp

5. For the truss shown in *Fig.5*, Find analytically the forces in the marked members *a, b, c, d, e,* and *f*. (18 marks)

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EX(4)

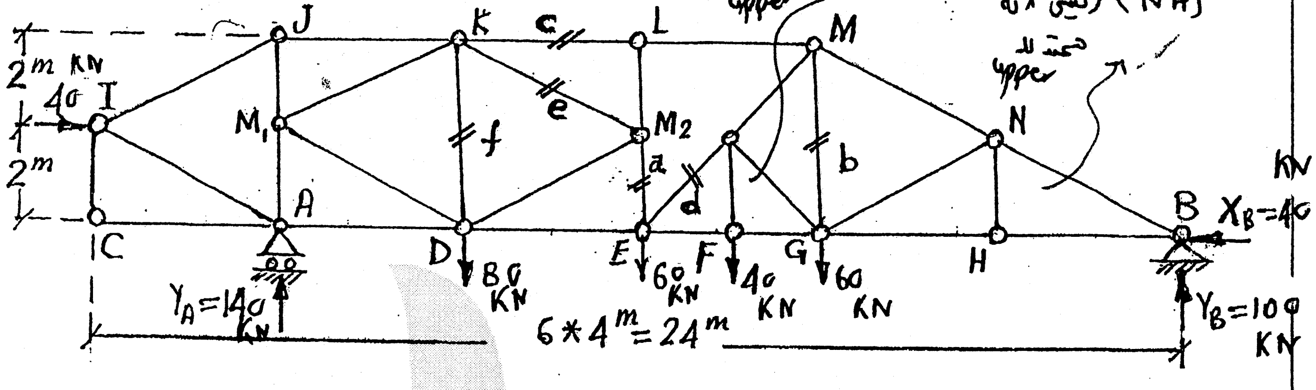
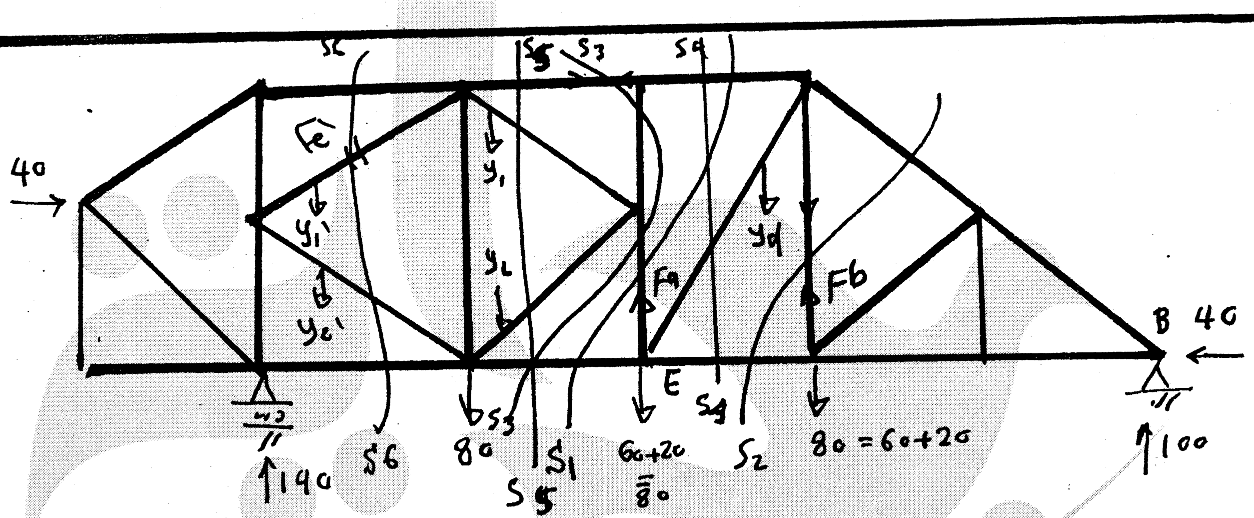
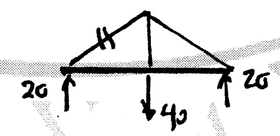


Fig. 5



(Fa) Sec (S_1-S_1) and $\Sigma y = 0$ right



$F_a - 80 + 100 = 0$ $\quad \therefore F_a = -20$

$F_a = 20$ Comp

(Fb) Sec (S_2-S_2) and $\Sigma M_B = 0$ right $\quad 100(0) + 40(0) + F_b(8) = 0$

$\therefore F_b = 0$

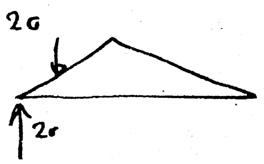
(Fc) Sec (S_3-S_3) and $\Sigma M_E = 0$ left

$-80(4) + 140(8) + 40(2) + F_c(4) = 0$ $\quad \therefore F_c = 220$ Comp

(Fd) Sec($S_4 - S_4'$) and $\Sigma y = 0$ ⑩ main right

$y_d + 80 - 100 = 0$ $\therefore y_d = 20$ $\therefore (F_d)_{main} = 20\sqrt{2}$ (tension)

$x_d = 20\left(\frac{4}{4}\right) = 20$ $\therefore x_d = 20$ $\therefore F_d = F_{d\,m} + F_{d\,sub}$



$y = 20$ $\therefore (F_d)_{sub} = -20\sqrt{2}$ $F_d = $ zero

$x = 20$

(Fe) Sec($S_5 - S_5$) and $\Sigma y = 0$ K-truss (left)

$y_1 + y_2 + 80 - 140 = 0$ $\therefore y_1 + y_2 = 60 \rightarrow ①$ $\therefore y_1 = 30$, $x_1 = 30$

$\frac{y_1}{y_2} = \frac{2}{2}$ $\therefore y_1 = y_2 \rightarrow ②$ ②، ① $\therefore F_e = 30\sqrt{2}$ tension

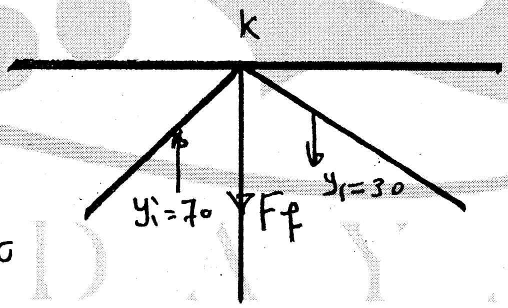
(Ff) حتى نتمكن من ايجاده يجب ايجاد X_1' ، F_e'

Sec($S_6 - S_6$) and $\Sigma y = 0$ $\therefore y_1' + y_2' = 140$

$\frac{y_1'}{y_2'} = \frac{2}{2}$ $\therefore y_1' = y_2'$ $\therefore y_1' = 70$ $\therefore F_e = 70\sqrt{2}$ Comp

Joint (K)

$y_1 + F_f - y_1' = 0$



$\therefore F_f = 70 - 30 = 40$ $\therefore F_f = 40$ tension

member	Fa	Fb	Fc	Fd	Fe	Ff
force	20	0	220	$20\sqrt{2} - 20\sqrt{2} = 0$	$30\sqrt{2}$	40
type	Comp	—	Comp	—	tension	tension

5. For the *Truss* shown in Fig.5, Find analytically the forces in the indicated members, a, b, c, d, e, f and g.

مثال مشابه 11

(20Marks)

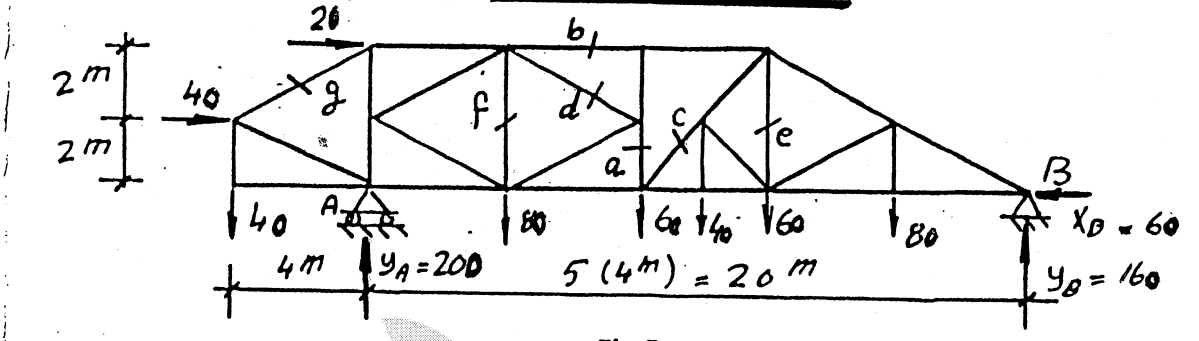
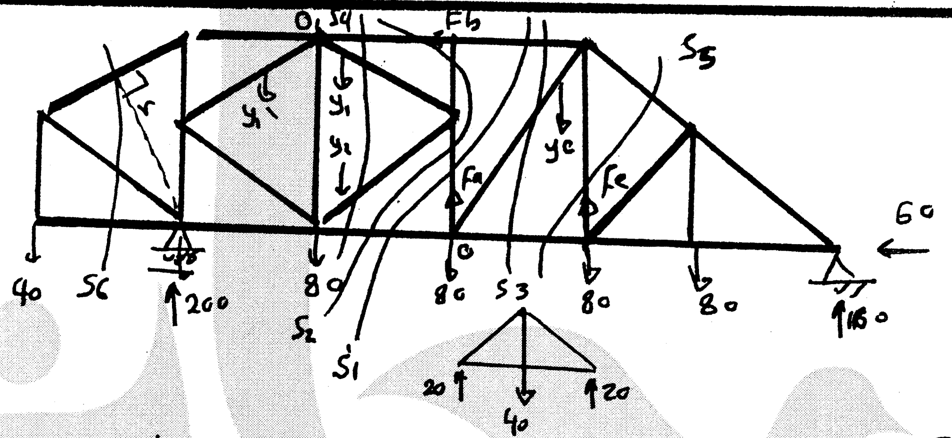


Fig.5



(Fa) Sec $(S_1 - S_1)$ and $\Sigma y = 0.0$ right $\quad F_a - 80 - 80 + 160 = 0 \quad \therefore F_a = 80$

-80

(Fb) Sec $(S_2 - S_4)$ and $\Sigma M_O = 0$ right $\quad 80(4) + 80(8) - 160(12) - F_b(4) = 0$

(Fc) Sec $(S_3 - S_3)$ and $\Sigma y = 0.0 \quad y_c + 80 + 80 - 160 = 0 \quad \therefore F_{c\,main} = 0$

$(y_c)_{sub} = 20 \quad \therefore (F_c)_{sub} = -20\sqrt{2}$

(Fd) Sec $(S_4 - S_4)$ and $\Sigma y = 0.0$ r. truss left $\quad y_1 + y_2 + 80 + 40 - 200 = 0$

$y_1 / y_2 = 2/2$

(Fe) Sec $(S_5 - S_5)$ and $\Sigma M_B = 0.0 \quad 80(4) - F_e(8) = 0.0$

(Ff) 5 joint تم ايجاد y_1' مثل y_1 $\quad F_f + y_1 - y_1' = 0$

(fg) Sec $(S_6 - S_6)$ and $\Sigma M_A = 0$ left $\quad 40(4) - 40(2) + F_g(r) = 0$

بعد حساب

- Find analytically, the forces in the members a, b, c, d, e and f (indicated by //) in the truss shown in Fig.(4).

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Example(5)

(22 marks)

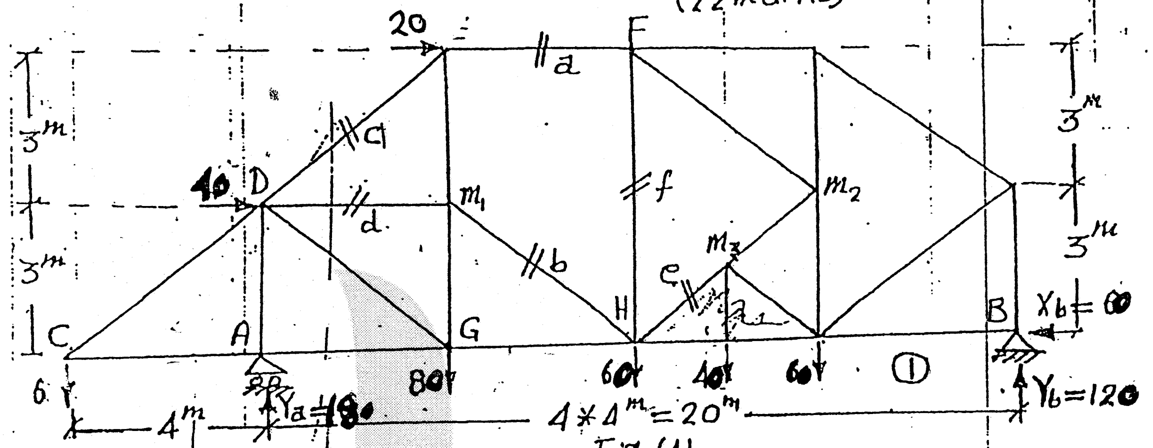
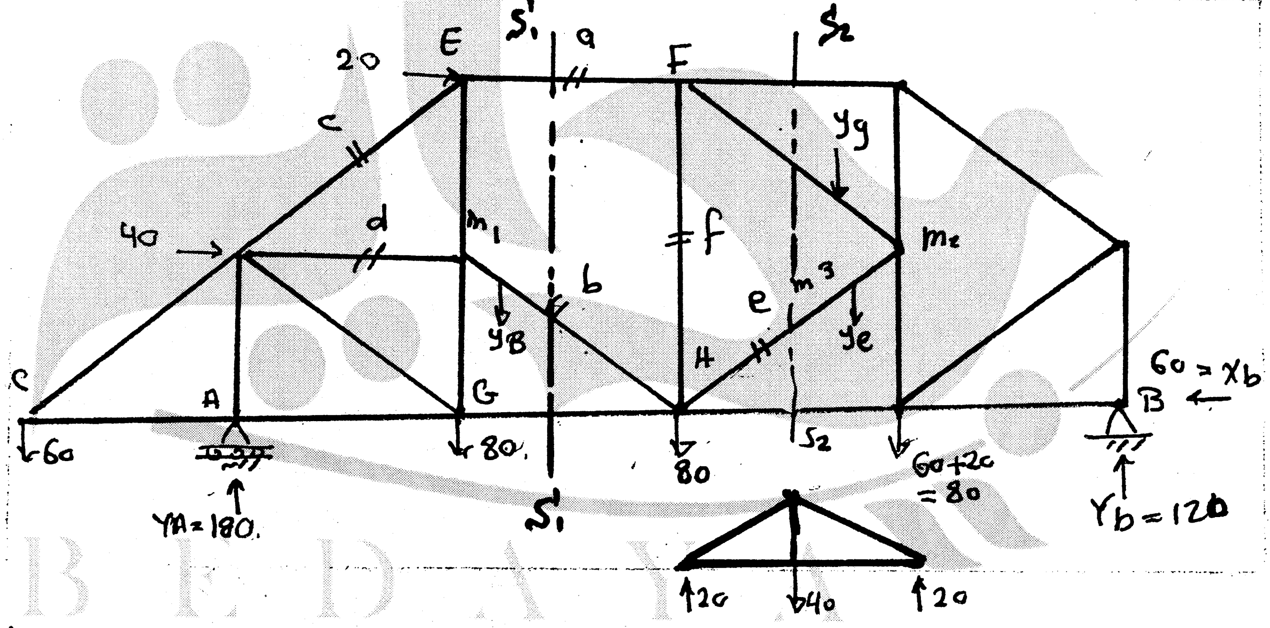


Fig.(4)



(Fa) Sec (S_1-S_1) and $\Sigma M_H = 0.0$ left

$$60(12) + 80(4) - 180(8) - 40(3) - 20(6) + F_a(6) = 0$$

$F_a = 106.67$ Comp

(Fb) Sec (S_1-S_1) and $\Sigma y = 0.0$ left

$$180 - 60 - 80 + y_b = 0 \qquad \therefore y_b = 40 \qquad X_b = \frac{4}{3}(4) = 53.3$$

$\therefore F_b = 66.67$ tension

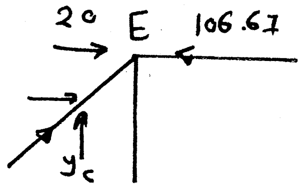
(fc) Joint (E) and $\Sigma X = 0.0$

(13)

$X_c = 106.67 - 20 = 86.67$

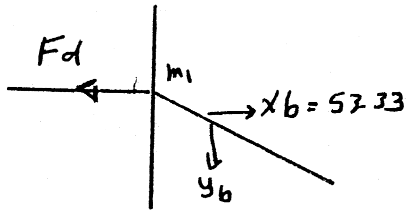
$Y_c = X_c \left(\frac{4}{3}\right) = 65$

$\therefore \boxed{F_c = 108.3\ Comp}$



(fd) Joint (m) and $\Sigma X = 0.0$

$\boxed{F_d = 53.33 \text{ tension}}$

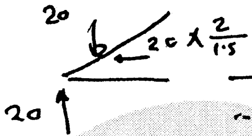


(fe) Sec (S2-S2) and $\Sigma Y = 0.0$ K truss (main) right

$Y_g + Y_e + 80 - 120 = 0$

$Y_g / Y_e = \frac{3}{3}$ $\therefore Y_g = Y_e$

$\therefore Y_e = Y_g = 20$



$\therefore F_e \text{ main} = 33.3$ ten.

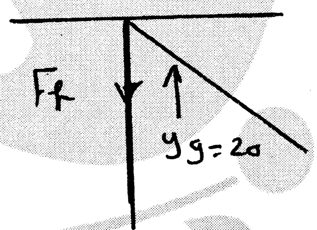
$\therefore F_e \text{ sub} = 20\sqrt{2} = 33.3$ Comp

$\therefore \boxed{F_e = Zero}$

(ff) Joint (f) and $\Sigma y = 0.0$

$F_f - 20 = 0$

$\boxed{F_f = 20 \text{ tension}}$



member	Fa	Fb	Fc	Fd	Fe	Ff
force	106.67	66.67	108.3	53.33	0	20
type	Comp	tension	Comp	tension	—	tension

14

امتحانات مشابهه

1) - For the truss shown in Fig. (4), it is required to calculate the forces in members marked with (//). (18 marks)

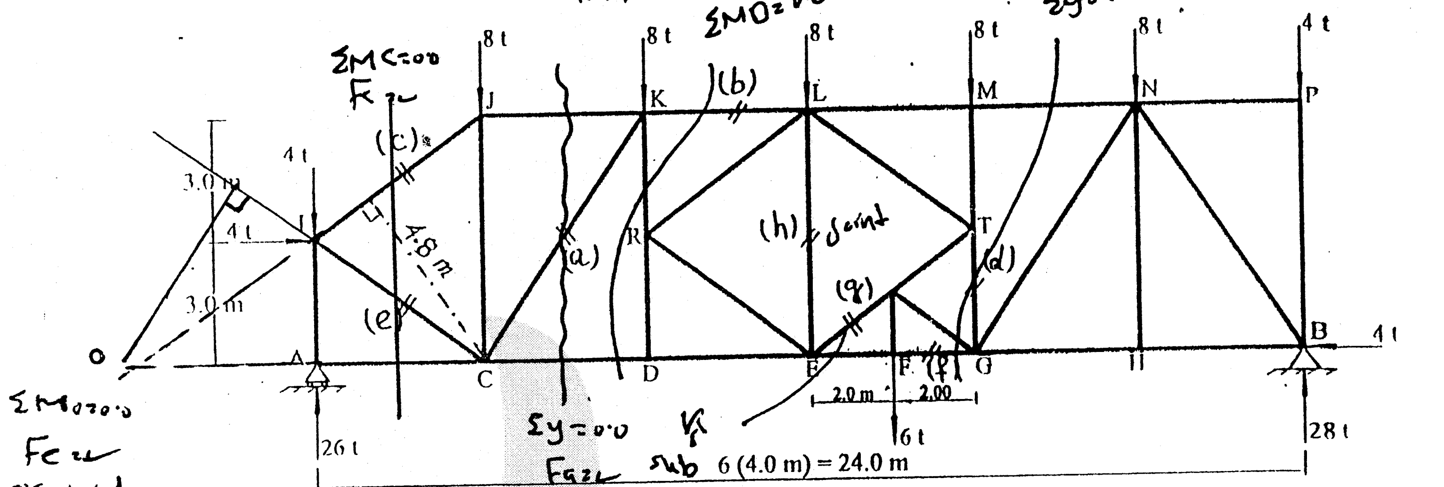
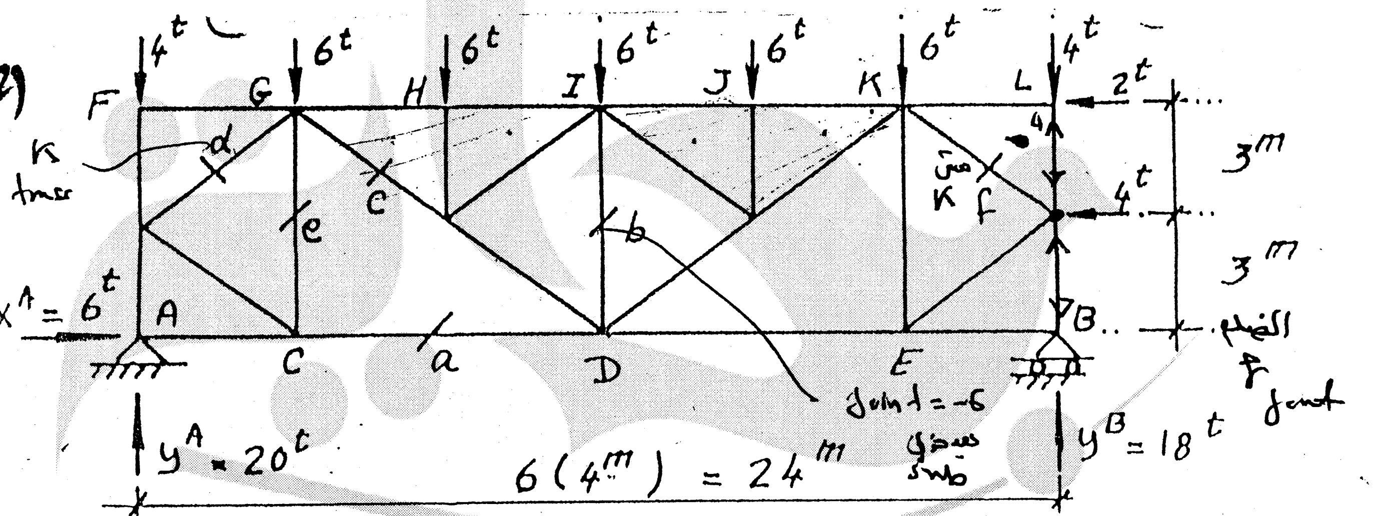
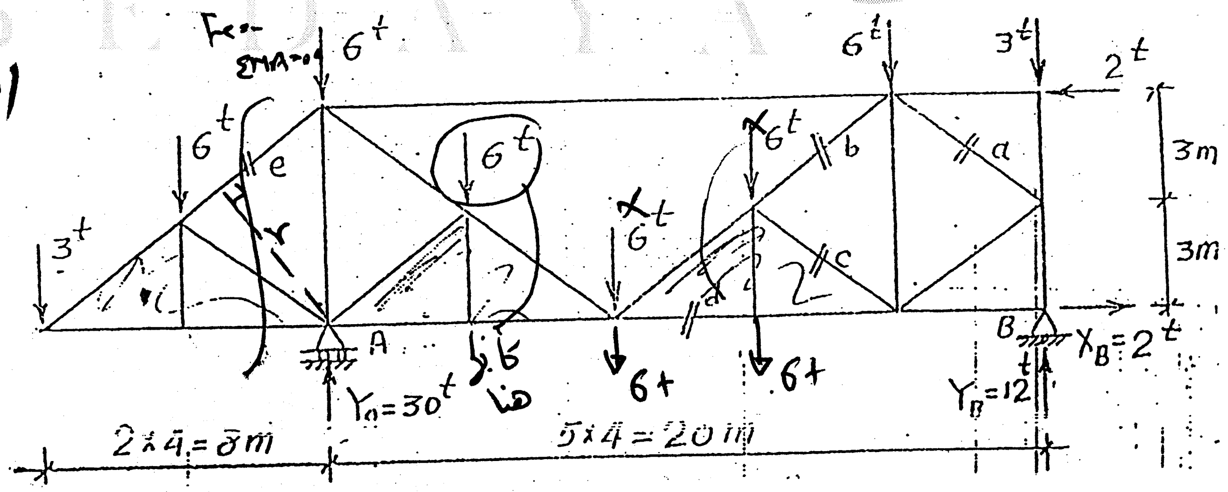


FIG. (4)

2)



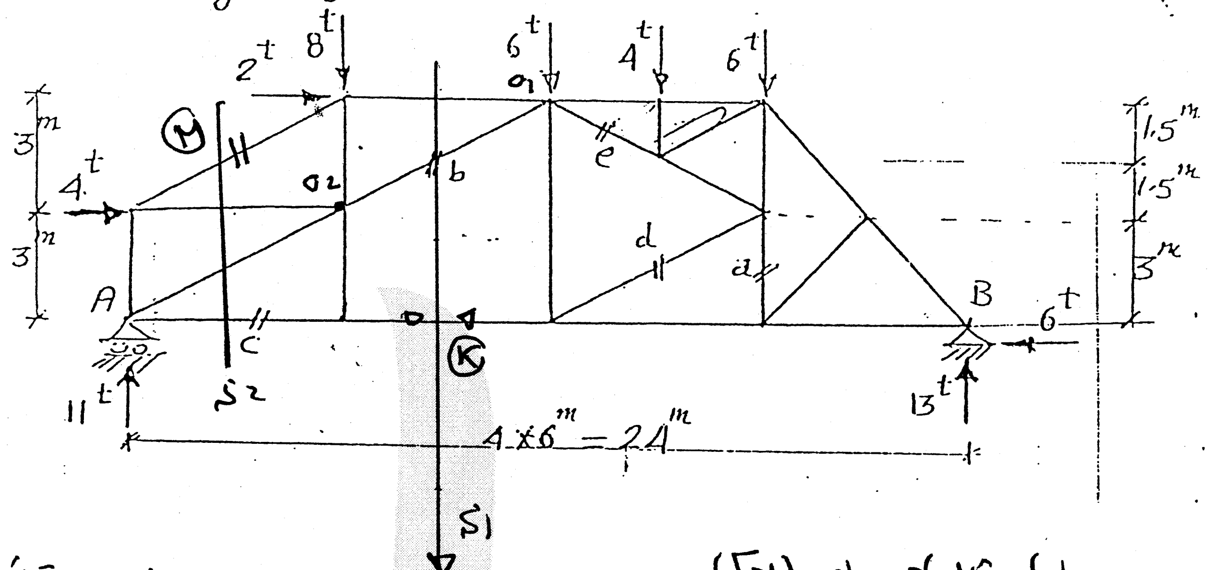
3)



*اذا بعد كوبري عكم قياسه على الورقه بـ Scale

(15)

4) Draw the Maxwell's Diagram for the truss shown in Fig-(1).
Check analytically, the forces in the members indicated by (//)



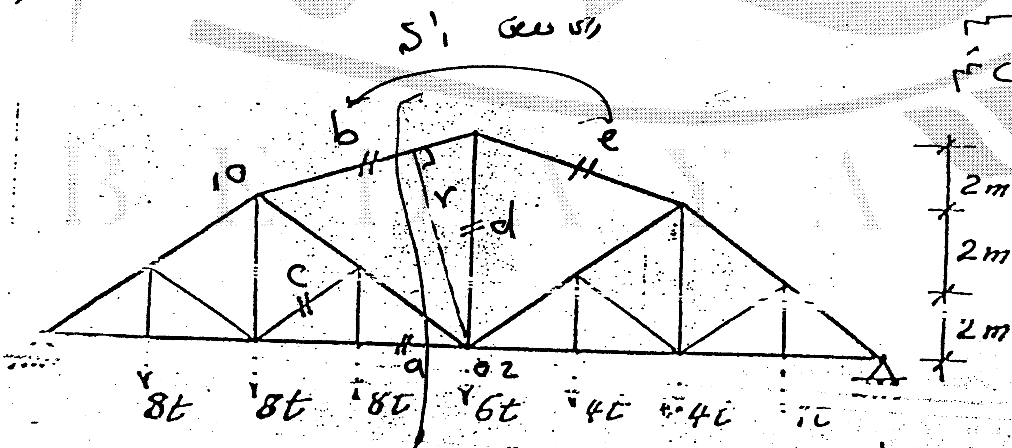
أحيانا نضطر لاختيار ضلع ما لوجد آخر مثل $Sec(S_1-S_1)$,
$\Sigma M_{o_1} = 0.0$ $\therefore F_K = \ldots$
ثم بـ Joint نوجد (FC) Sol

بالمقطع لايجاد (FM)
نأخذ $\Sigma M_{o_2} = 0.0$ لمعلومية
عزم (FC) المحسوب نحسب
$F_M = \ldots$

---

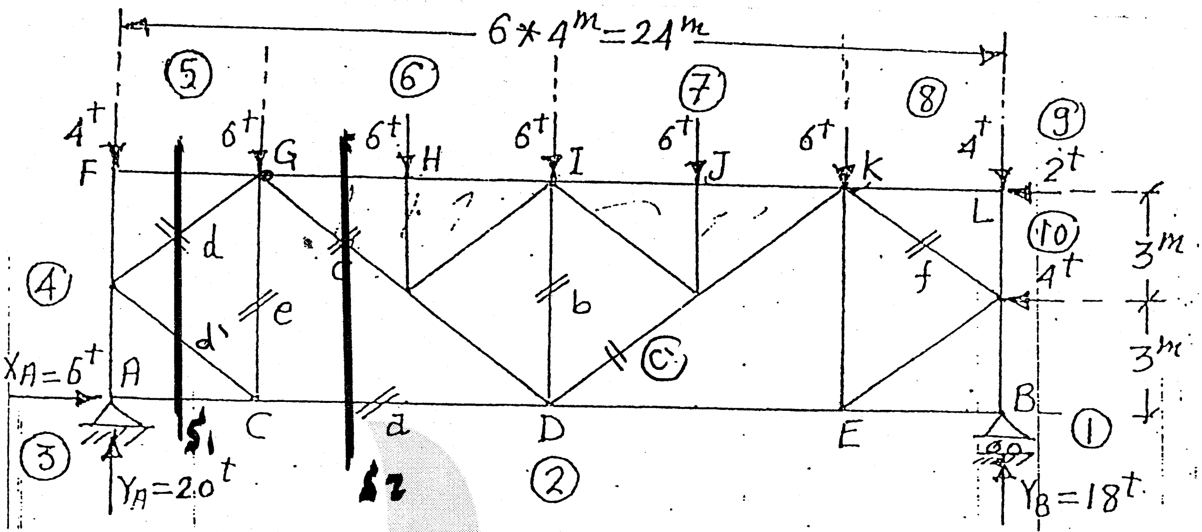
5)

للتركيب الشبكي المبين بالشكل ، ارسم شكل تجمع القوى ثم تحقق حسابيا من القوى في الأعضاء المؤشر عليها بعلامة (//)



- $Sec(S_1-S_1)$ and $\Sigma M_{o_2} = 0.0 \rightarrow F_b = \ldots$
  $\Sigma M_{o_1} = 0.0 \rightarrow F_{a\,moment} = \ldots t$
- $F_c \rightarrow$ Joint ... $\rightarrow F_{a\,sub} = \ldots$ Joint
- $F_e = F_b$
- $F_d =$ Joint

6)



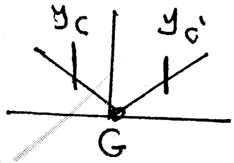
(Fd) → K truss sec (S1 – S1) and ΣY $\frac{y_1}{y_2} = \frac{3}{3}$, $y_1 + y_2 = 20$

(Fe) → (Fd) معروف , Fd' → joint (c) and ΣY

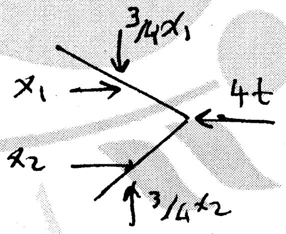
(Fa) → sec (S2 – S2) and ΣMO1 = ΣMG = 0.0

(Fc) → sec (S2 – S'2) and ΣY = 0.0 + subdivided.

(Fb) → Fc main معلومية / c' توحيد and ΣY = 0.0 for joint G



(Fe) صفر → لاحل (K) ليسحب → joint
معها.



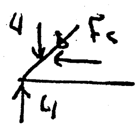
$x_1 = x_2 = 2t$

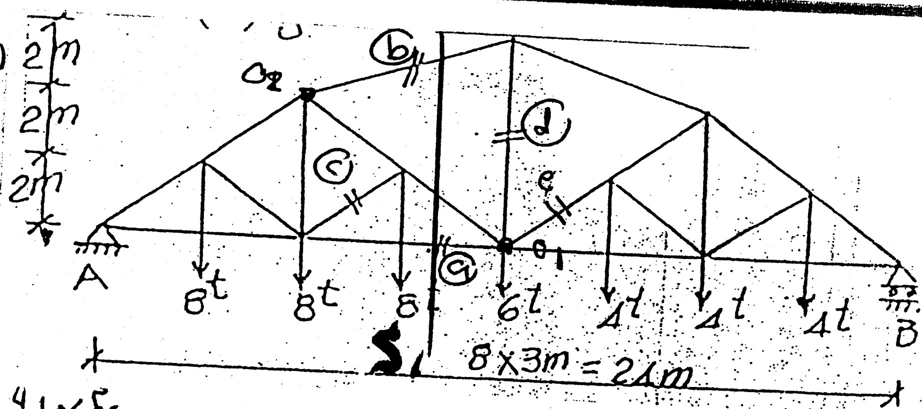
3

(Fb) → sec(S1) and ΣM o1 = 0.0

(Fa) → sec(S1) and ΣM o2 = 0.0 + ثانوي

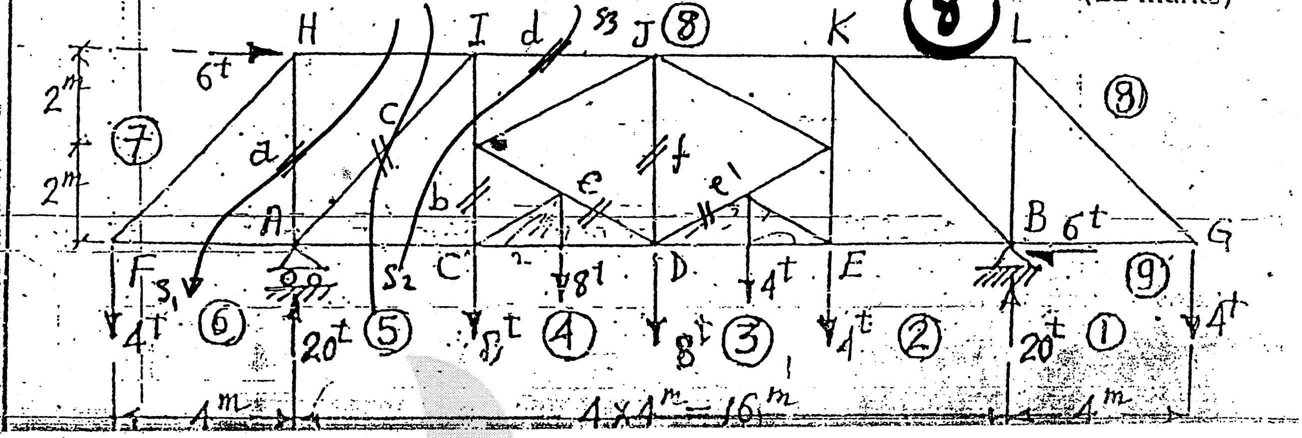
(Fc) → ثانوي نقطة joint





(Fd) → joint (o1) ونوحيد (e) كأنها d

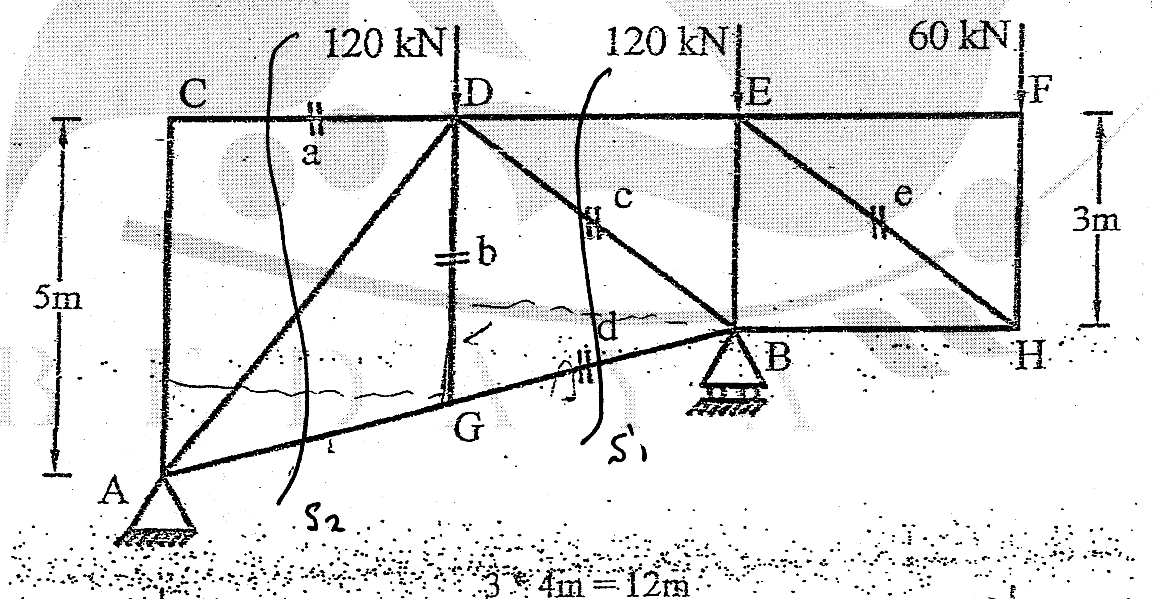
4- For the truss shown in Fig. (4), draw the Maxwell's diagram (Scale: 1cm = 4 ton). Find analytically the forces in the members a, b, c, d, e, and f indicated by (//). Compare the forces obtained with the graphical solution. (22 marks)



[Fa S_1, $\Sigma y = 0$] ، [Fc S_2, Σy] ، [Fd S_3, $\Sigma M c$] ، [Fb joint C]
بعد حذف الأصفار

[Fe من S ktruss] ، [Ff joint G e']

أفكار متنوعة



* علينا ايجاد ضلع مساعد غير مطلوب لايجاد ضلع آخر مثل ايجاد

Fd → S_1, $\Sigma MD = 0$ مطلوب

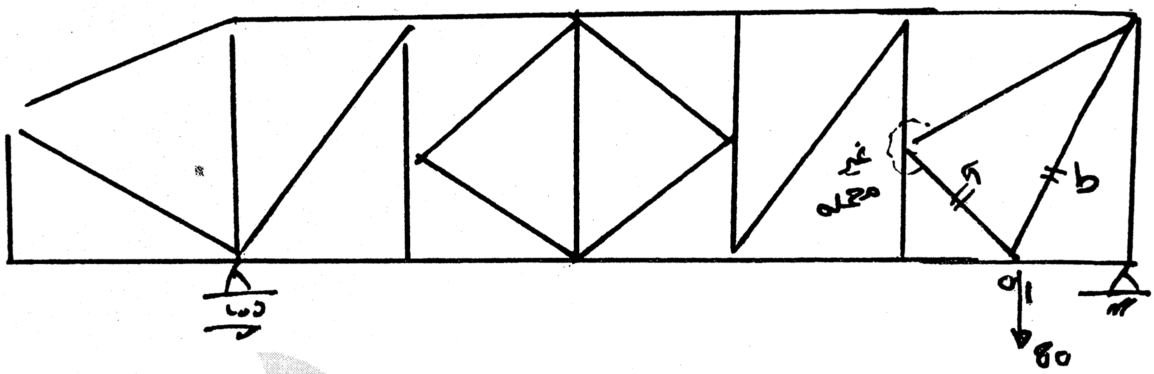
مثلا Fd' → S_2, $\Sigma MD = 0$ غير مطلوب } joint G

نكملها ايجاد (A G) مباشرة

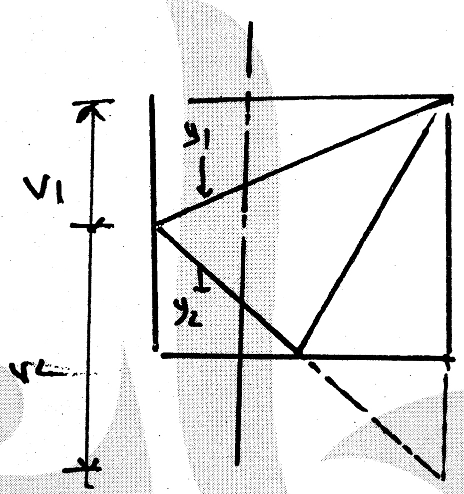
$\Sigma X = 0.0$

Fd

حالة خاصة K truss



(K) truss

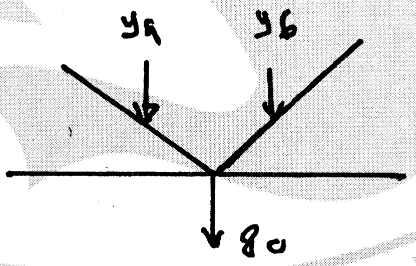


$\Sigma y = 0.0$ from left

$\therefore y_1 + y_2 = c$

$\frac{y_1}{y_2} = \frac{V_1}{V_2}$ } بالقياس

Joint (a1)

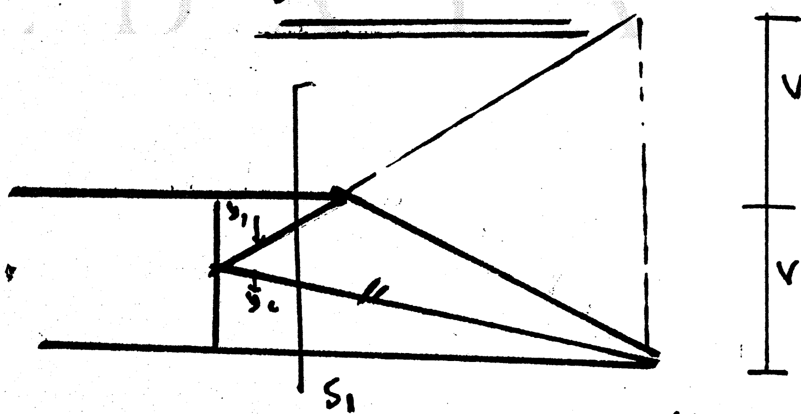


$\Sigma y = 0.0$

$y_a + y_b + 80 = 0$

$y_b = c$

صورة أخرى



$y_1 + y_2 = \Sigma y$ $\qquad y_1 \div y_2 = \frac{V_1}{V_2}$