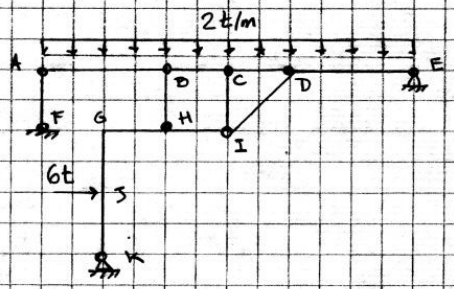
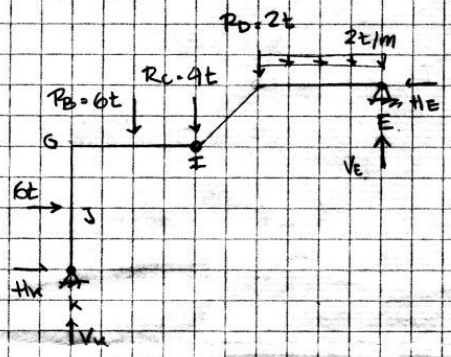
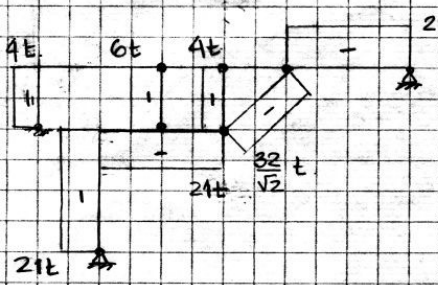
RESOLUCIÓN Primer Parcial Resistencia 1N | 29/09/2008

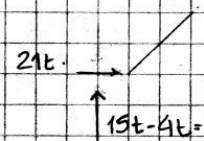
Ejercicio 1

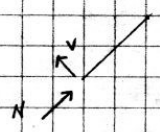




(N)



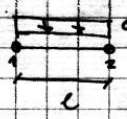




$$N = 11\frac{1}{\sqrt{2}} + 21\frac{1}{\sqrt{2}} = \frac{32}{\sqrt{2}}$$

$$V = 11\frac{1}{\sqrt{2}} - 21\frac{1}{\sqrt{2}} = -\frac{10}{\sqrt{2}}$$

* tramos flotantes:



$R_1 = R_2 = \frac{q\ell}{2}$

tramo AB: $R_A = R_B^{izq} = \frac{2t/m \cdot 4m}{2} = 4t$

tramo BC: $R_B^{der} = R_C^{izq} = \frac{2t/m \times 2m}{2} = 2t$

tramo CD: $R_C^{der} = R_D = \frac{2t/m \times 2m}{2} = 2t$

$R_A = 4t$
$R_B = R_B^{der} + R_B^{izq} = 2t + 4t = 6t$
$R_C = R_C^{der} + R_C^{izq} = 2t + 2t = 4t$
$R_D = 2t$

* pórtico: arco de 3 articulaciones

incognitas: V_E, H_E, V_K, H_K

ecuaciones de equilibrio:

① $\Sigma V = 0 \rightarrow V_K + V_E = 6t + 4t + 2t + 2t/m \times 4m = 2$

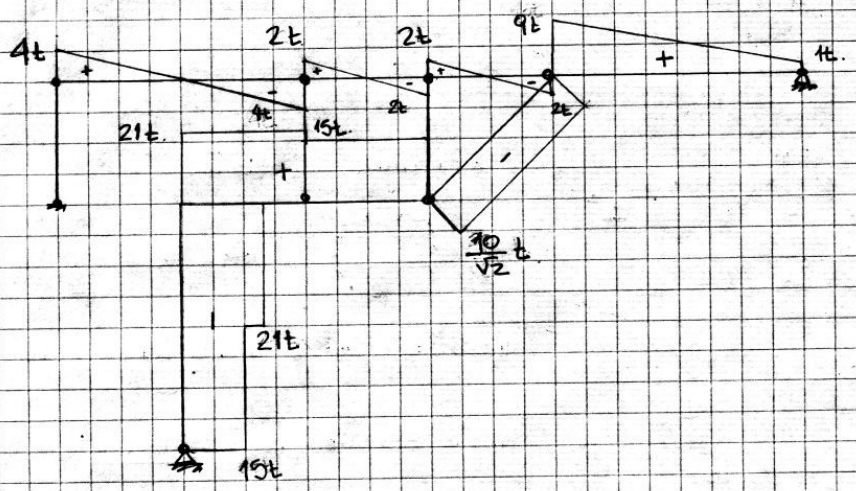
② $\Sigma H = 0 \rightarrow H_K + 6t = H_E$

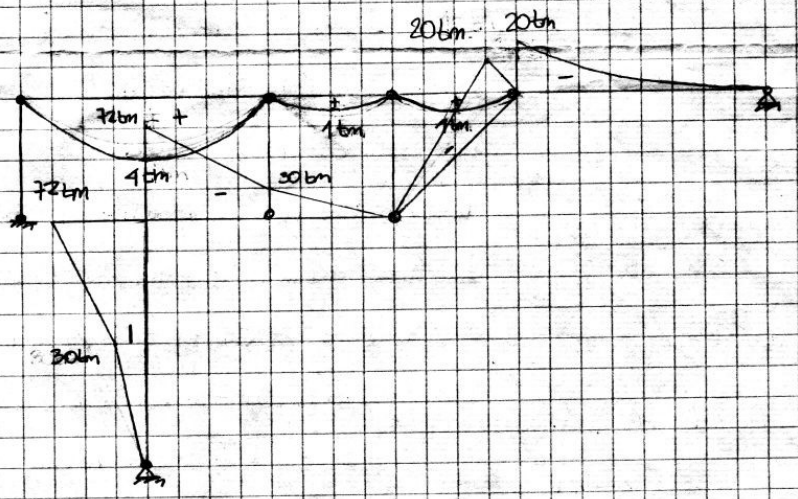
③ $\Sigma M_K = 0 \rightarrow 6t \times 2m + 6t \times 2m + 4t \times 4m + 2t \times 6m$
$+ 2t/m \times 4m \times 8m - H_E \times 6m - V_E \times 10m$
$58\,tm = H_E\,3m + V_E\,5m$

④ $\Sigma M_I^{der} = 0 \rightarrow 2t \times 2m + 2t/m \times 4m \times 4m - V_E\,6m - H_E \times 2m$
$18\,tm = V_E\,3m + H_E$

$V_E = -1t$ $\quad V_K = 21t$
$H_E = 21t$ $\quad H_K = 15t$

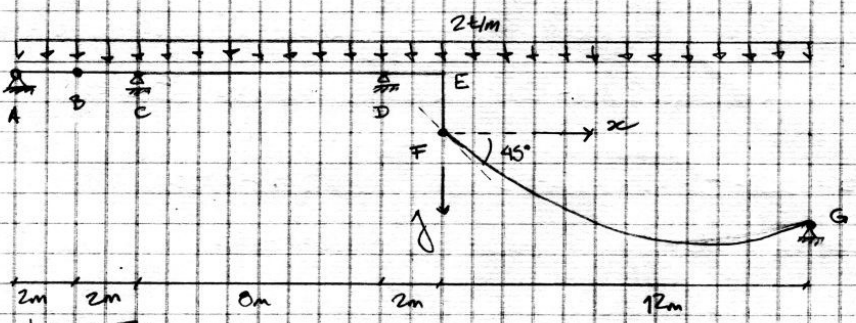
Ⓥ


4t
2t
2t
9t
1t.
21t.
15t.
2t
2t
$\frac{10}{\sqrt{2}}$ t.
21t
15t


20tm
20tm
72tm
1tm
72tm
4tm
30tm
30tm

Resolución 1° Parcial 1N 29/09/08

Ejercicio 2



tramo FG

$y(x) = -\frac{1}{2}\frac{q}{H}x^2 + C_1 x + C_2$

$y(0) = 0$ | $q = 2t/m$ | $y(x) = -\frac{1}{H}x^2 + C_1 x$

$y'(0) = \tg 45° = 1 \rightarrow C_1 = 1$

$y(12) = 3 \rightarrow -\frac{1}{H}(12)^2 + 12 = 3 \quad H = 16$

$y(x) = -\frac{1}{16}x^2 + x$

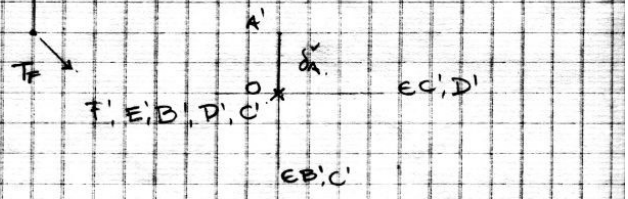
$y'(x) = -\frac{1}{8}x + 1$

a) Tmínimo = 16 se da en x_1 / $y'(x_1) = 0$ $x_1 = 8$ $y_1 = 4$

$T_{máx} = H\sqrt{1 + 1^2} = \sqrt{2}H$ en F por tener allí, el cable, la máxima pendiente.

b)

libero el vínculo que restringe el desplazamiento vertical



Trabajos virtuales

$V_A \cdot \delta_A - 4t \times \frac{\delta_A}{2} = 0 \quad V_A = 2t$

c)

eq H: $H_A = H_G = 16t$.

eq V: $V_A + V_C + V_D + V_G = 2 \times 26 = 52t$ $\quad V_C + V_D + V_G = 50t$. $(V_A = 2t)$

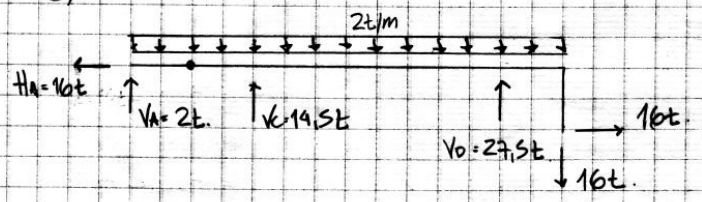
eq M_F^{cm}: $V_D \times 2 + V_C \times 10 + V_A \times 14 - 2 \times 14 \times 7 - H_A \times 2m = 0$ $\quad V_D + 5V_C = 100$

eq M_F^{der}: $V_G \, 12 + H_G \times 3m - 2 \times 12 \times 6 = 0$ $\quad V_G = 8t$

$V_D = 50 - 8 - V_D = 42 - V_C$ $\quad V_D = 27,5t$

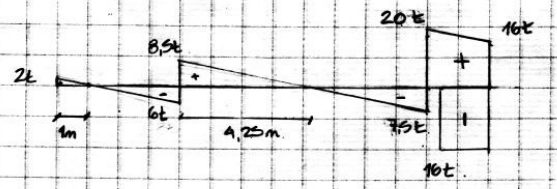
$42 - V_C + 5V_C = 100$ $\quad 4V_C = 58$ $\quad V_C = 14,5t$.

d)



(N)

(V)



(M)