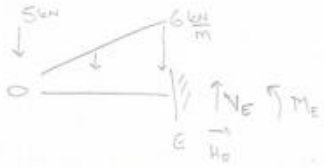
Solución Examen Feb 2025

Ejercicio 1

a)

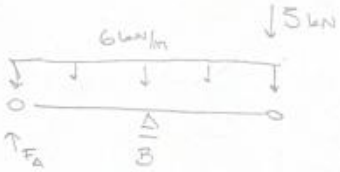
$F_C = F_D = 5\,kN$



$V_E = 5\,kN + \frac{6\,kN}{m} \cdot 2m/2 = 11\,kN$

$H_E = 0$

$M_E = -5\,kN \cdot 2m - \frac{6\,kN}{m} \cdot \frac{2m}{2} \cdot \frac{2}{3}m = -14\,kNm$



$V_B = \frac{\frac{6\,kN}{m} \cdot 2m \cdot 1m + 5\,kN \cdot 2m}{1m} = 22\,kN$

$F_A = \frac{6\,kN}{m} \cdot 2m + 5\,kN - 22\,kN = -5\,kN$

Por simetría $N_{FI} = N_{GI}$

Por eq. en I $N_{FI} = -N_{GI}$

$\Rightarrow N_{FG} = 0$

$\Big\} \; N_{GI} = N_{FI} = 0$

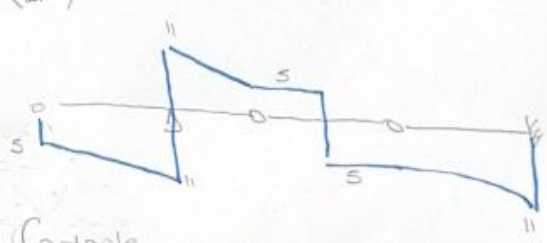
$N_{AF} = N_{FH} = N_{AG} = N_{GJ} = \frac{\sqrt{2}}{2}\,5\,kN = 3{,}53\,kN$

$N_{HI} = N_{IJ} = -\frac{N_{FH}}{\sqrt{2}} = -2{,}5\,kN$

$V_H = V_J = 2{,}5\,kN \downarrow$

b) N(kN)

V(kN)



Cortante es nulo en reticulado

M(kNm) Momento es nulo en reticulado

c) $\sigma_{adm} \geq \frac{M}{W} \Rightarrow W \geq \frac{M_{max}}{\sigma_{adm}} = 500\ cm^3 \rightarrow$ IPN 160

d) $\sigma_{adm} \geq \frac{N}{A}$; $A = \pi(R^2 - (R-e)^2) = \pi(2Re - e^2)$, $|N_{max}| = 3{,}53\ kN$

$\Rightarrow R = 5\ mm$

e) $\delta_D = \frac{5kN\ (2m)^3}{3EI} + \frac{6kN/m\ (2m)^4}{30EI} = 8{,}8\ mm$ $(I = 935\ cm^4)$

<u>Ejercicio 2)</u>

Suma de Fv=0 → RA+RF= 30+40*1.4= 86 kN

Suma FH=0 → HA+HF=2 kN

Suma MG=0

Suma Mizq C = 0

RA.1m-HA.3m-40*1.4*0.5=0

RA+RF= 30+40*1.4= 86 kN

RA = 40 kN

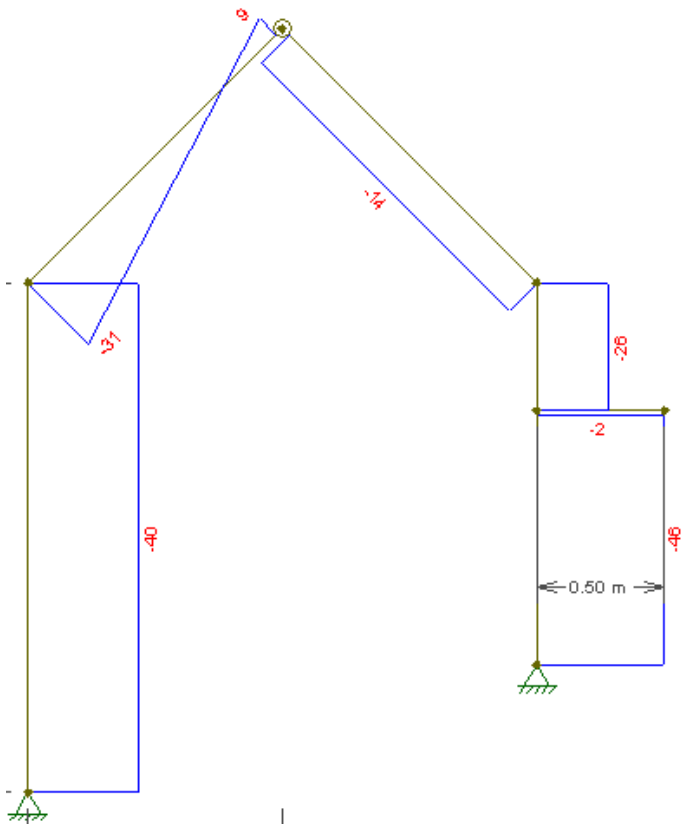
RF= 46 kN

HA+HF=2 kN

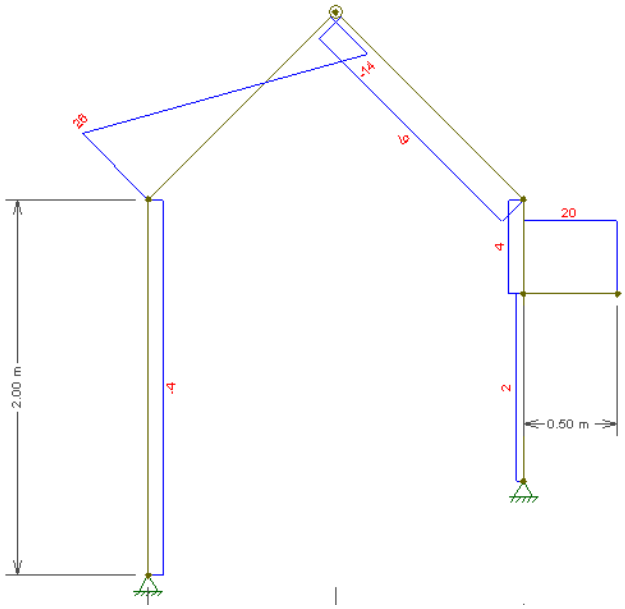
HA=4 kN

HG=2 kN

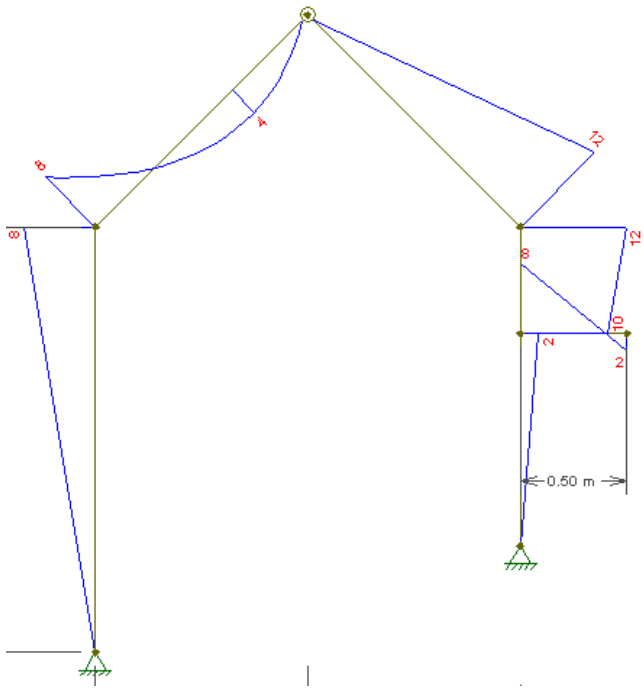
N (kN)



V(kN)



M(kNm)



Mmax= 12 kN.m

140000000≥12000/W

W≥ 85.72 cm3

IPN 160

W= 117 cm3

A= 22.8 cm 2

Pmax=

140≥ M/W +P/A= 102.6+20.2=122.8 MPa