UNIVERSIDADE POSITIVO

Engenharia Civil

Exercícios de Avaliação: **TE14-EAV-B2-1000**

Disciplina: Teoria das Estruturas

Nota:

Turma:

Aluno: GABARITO 3MB

Matrícula:

Consulta livre a cadernos e livros

Questão 01:

- Esboce os diagramas de ~~esforços cortantes e~~ esforços axiais (normais) para o(s) trecho(s) AF E FC.

q1 = 10 kN/m

q2 = 0 kN/m

P1 = 30 kN

P2 = 30 kN

P3 = 0 kN

M1 = 0 kN.m

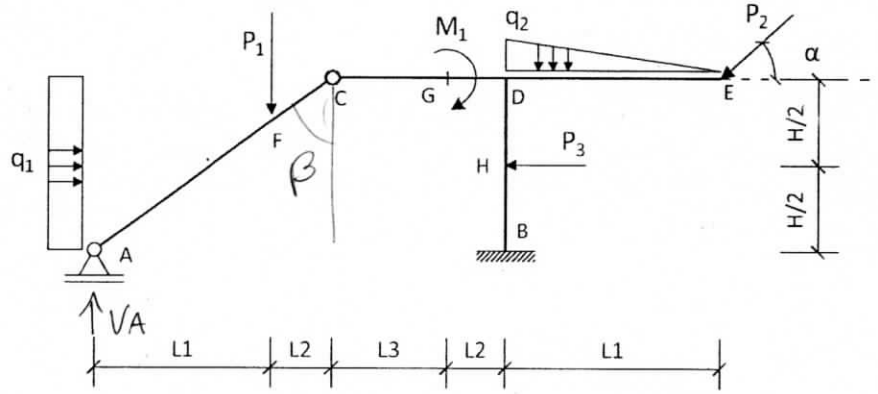
H = 5 m

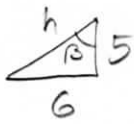
L1 = 4 m

L2 = 2 m

L3 = 3 m

α = 35°





$h = \sqrt{5^2+6^2} = 7{,}810$

$\cos\beta = 5/7{,}810 = 0{,}6402$

$\operatorname{sen}\beta = 6/7{,}810 = 0{,}7682$

$q_{//} = 10\,kN/m \times 0{,}6402 \times 0{,}7682 = 4{,}918\,kN/m$ //

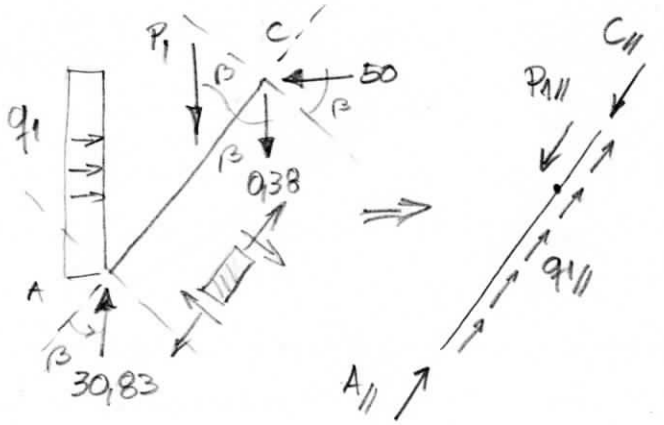
$P_{1//} = 30\,kN \times 0{,}6402 = 19{,}21\,kN$ //

$\Sigma M_C^{ESQ} = 0 \circlearrowleft \oplus \quad -V_A \times 6m + 10\,kN/m \times (5m)^2/2 + 30\,kN \times 2m = 0$

$V_A = 1/6\,(10 \times 25/2 + 60) = 30{,}83\,kN$ //

$\Sigma F_H = 0 \rightarrow \oplus \quad 10\,kN/m \times 5m - H_C = 0 \qquad H_C = 50\,kN$ //

$\Sigma F_V = 0 \uparrow \oplus \quad 30{,}83\,kN - 30\,kN + V_C = 0 \qquad V_C = 0{,}83\,kN$ //



$A_{//} = -30{,}83\,kN \times 0{,}6402 = -19{,}74\,kN$ //

$C_{//} = -0{,}83 \times 0{,}6402 - 50 \times 0{,}7682$

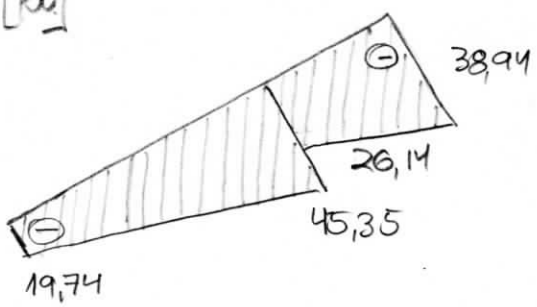
$C_{//} = -38{,}94\,kN$ //

$P_{1//}^{DIR} = -38{,}94\,kN + 4{,}918\,kN/m \times 2/6 \times 7{,}810\,m$

$P_{1//}^{DIR} = -26{,}14\,kN$ //

$P_{1//}^{ESQ} = -26{,}14\,kN - 19{,}21\,kN = -45{,}35\,kN$ //

(N) [kN]



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q1 = 10 kN/m

q2 = 0 kN/m

P1 = 30 kN

P2 = 30 kN

P3 = 15 kN

M1 = 0 kNm

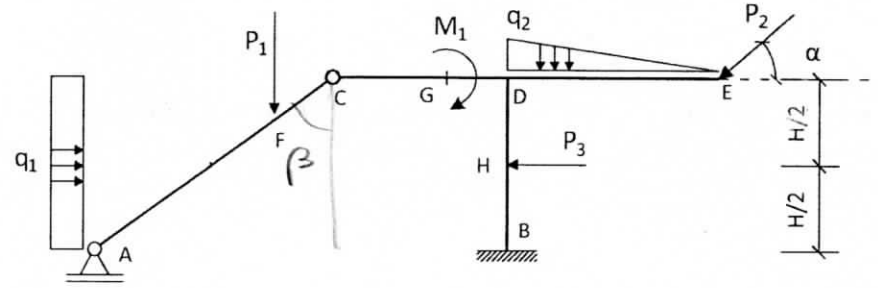
H = 5m

L1 = 4m

L2 = 2m

L3 = 3m

α = 30°

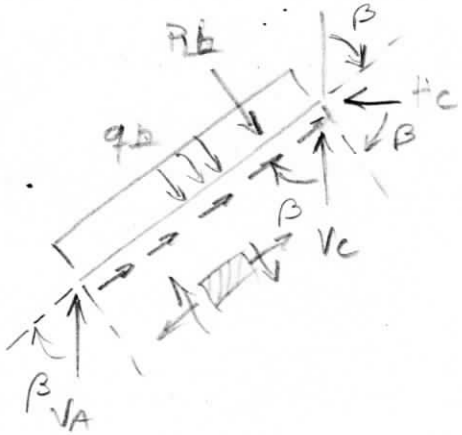




$h = \sqrt{5^2+6^2} = 7{,}810$

$\cos\beta = 5/7{,}810 = 0{,}6402$

$\operatorname{sen}\beta = 6/7{,}810 = 0{,}7682$



$q_{\perp} = 10\,kN/m \times 0{,}6402^2 = 4{,}099\,kN/m$

$P_{1\perp} = 30\,kN \times 0{,}7682 = 23{,}05\,kN$

$\Sigma M_C^{ESQ} = 0 \quad \circlearrowleft(+) \quad -V_A \times 6m + 10\,kN/m \times (5m)^2/2 + 30\,kN \times 2m = 0$

$V_A = 1/6\,(10 \times 25/2 + 60) = 30{,}83\,kN \uparrow$

$\Sigma F_H = 0 \rightarrow(+) \quad 10\,kN/m \times 5m - H_C = 0 \quad H_C = 50\,kN \leftarrow$

$\Sigma F_V = 0 \uparrow(+) \quad 30{,}83\,kN - 30\,kN + V_C = 0$

$V_C = -0{,}83\,kN < 0{,}83\,kN \downarrow$

$A_{\perp} = V_A \cdot \operatorname{sen}\beta = 30{,}83 \times 0{,}7682 = 23{,}68\,kN$

$C_{\perp} = 0{,}83 \cdot 0{,}7682 - 50 \cdot 0{,}6402 = -31{,}37\,kN$

$P_1^{ESQ}{}_{\perp} = 23{,}68\,kN - 4{,}099 \times 4/6 \times 7{,}810 = +2{,}337\,kN$

$P_1^{DIR}{}_{\perp} = 2{,}337\,kN - 23{,}05\,kN = -20{,}71\,kN$

