Engenharia Civil
Teoria das Estruturas 2014
Exercícios de Avaliação – B1
Professor: Juliano J. Scremin

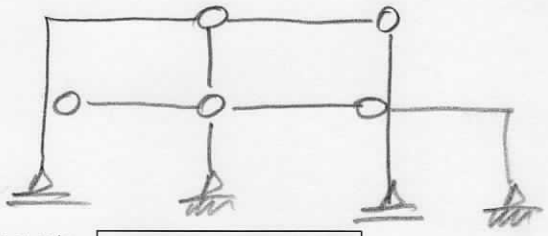
TE14-EAV-B1-1000

Aluno: CABARITO Turma: 3MA

- Consulta livre a cadernos e livros

Questão 01:

- Determine o grau estático do modelo estrutural abaixo:



$h_{ext} = 6 - [(4-1).1 + (3-1).1 + (2-1).3] - 3$

$h_{ext} = 6 - [3 + 2 + 3] - 3$

$h_{ext} = 6 - 8 - 3 = -5$

$h_{int} = 3.2 = +6$

$+1$

Resposta: HIPER. GRAU +1

Questão 02:

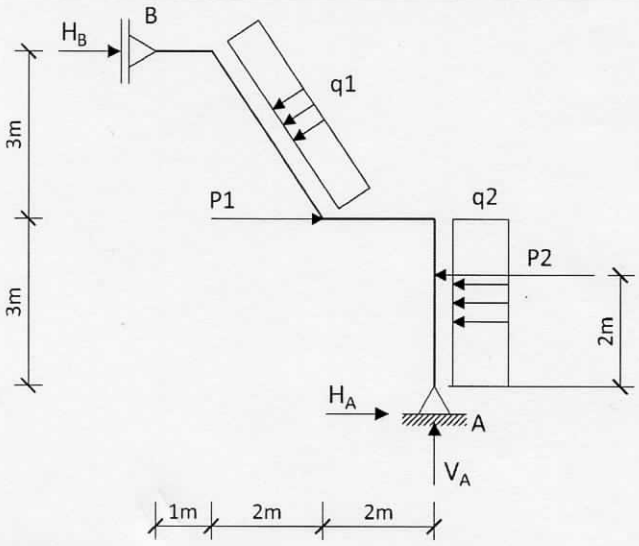
- Calcule as reações de apoio HB e VA do modelo estrutural ao lado dado que:

q1 = 15 kN/m

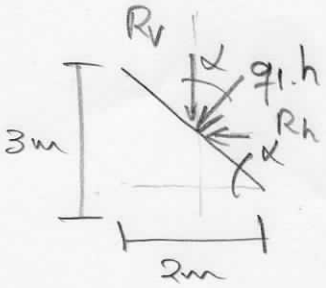
q2 = 10 kN/m

P1 = 35 kN

P2 = 20 kN



Resposta: HB = 45,416 kN
VA = 30 kN



$h = \sqrt{3^2 + 2^2} = \sqrt{13}$

$R_V = q_1 . h . \cos\alpha = 15\,kN/m . \sqrt{13}\,m . 2/\sqrt{13} = 30\,kN$

$V_A = R_V = 30\,kN$

$R_h = q_1 . h . \operatorname{sen}\alpha = 15\,kN/m \times \sqrt{13} . 3/\sqrt{13} = 45\,kN$

$\Sigma M_A = 0$ (+)

$-H_B \times 6m + R_h \times 4{,}5m + R_V \times 3m - 35kN \times 3m + 20kN \times 2m + 10kN/m \times 3m \times 1{,}5m = 0$

$H_B = 1/6\,(45 \times 4{,}5 + 30 \times 3 - 35 \times 3 + 20 \times 2 + 10 \times 3 \times 1{,}5) = 45{,}416\,kN$

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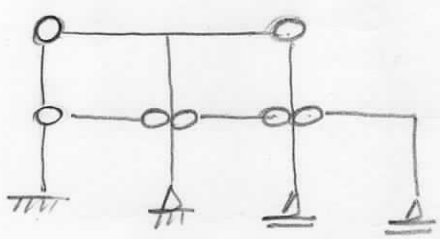
TE14-EAV-B1-1000

Aluno: GABARITO Turma: 3MB

- Consulta livre a cadernos e livros

Questão 01:

- Determine o grau estático do modelo estrutural abaixo:



$h_{ext} = 7 - [(3-1)\cdot 1 + (2-1)\cdot 6] - 3$

$h_{ext} = 7 - [2+6] - 3$

$h_{ext} = 7 - 8 - 3 = -4$

$h_{int} = 3.2 = +6$

$+2$ HIPERESTÁTICA

Resposta: +2

Questão 02:

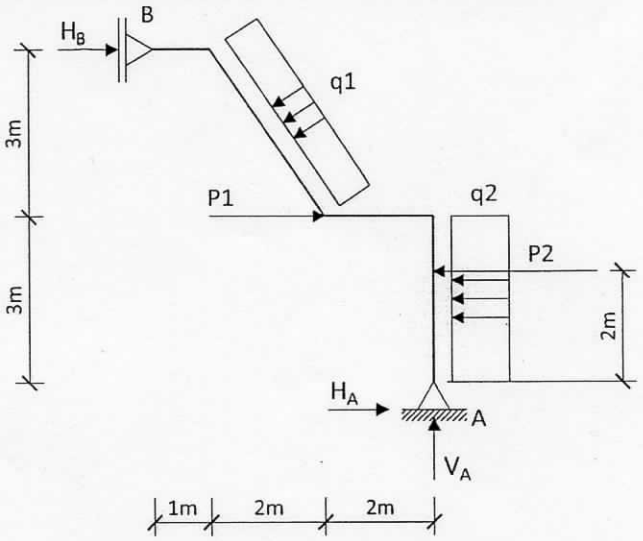
- Calcule as reações de apoio V_A e H_B do modelo estrutural ao lado dado que:

q1 = 10 kN/m

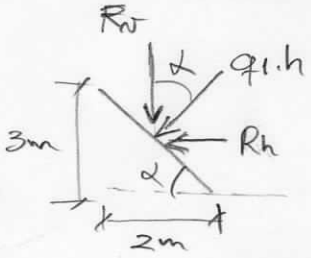
q2 = −15 kN/m

P1 = 30 kN

P2 = 15 kN



Resposta: $V_A = 20$ kN, $H_B = 11{,}25$ kN



$h = \sqrt{3^2+2^2} = \sqrt{13}$

$R_V = q1.h.\cos\alpha = 10.\sqrt{13}.2/\sqrt{13} = 20$ kN

$\Sigma F_V = 0$ ↑⊕ $V_A - R_V = 0$ $V_A = R_V$ **$V_A = 20$kN**

$R_h = q1.h.\operatorname{sen}\alpha = 10.\sqrt{13}.3/\sqrt{13} = 30$ kN

$\Sigma M_A = 0$ ↻⊕ $-H_B.6m + R_V.3m + R_h.4{,}5m - 30kN.3m + 15kN.2m - 15kN/m.3m.1{,}5m = 0$

$H_B = \frac{1}{6}(20.3 + 30.4{,}5 - 90 + 30 - 45.1{,}5) = 11{,}25$ kN

$H_B = 11{,}25$kN

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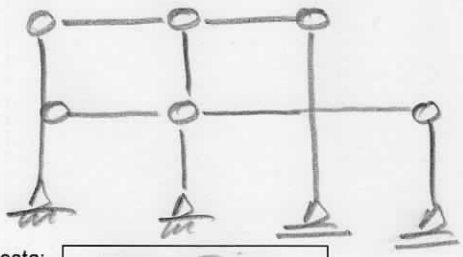
TE14-EAV-B1-1000

Aluno: GABARITO Turma: 3NB

- Consulta livre a cadernos e livros

Questão 01:

- Determine o grau estático do modelo estrutural abaixo:



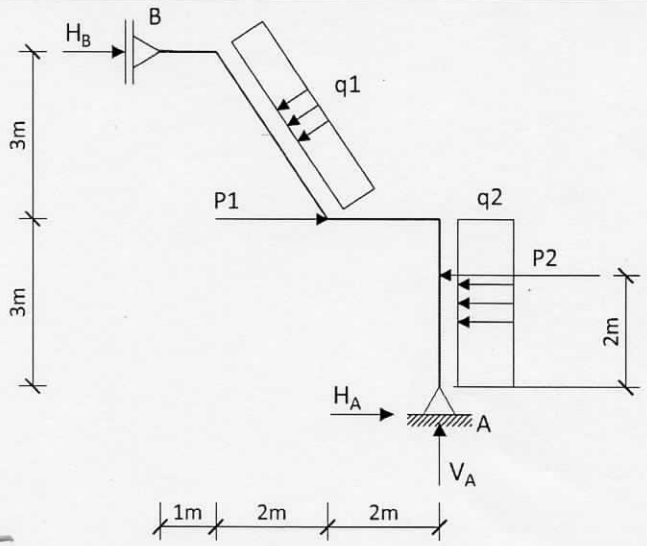
$$h_{ext} = 6-[(4-1)\cdot1+(3-1)\cdot1+(2-1)\cdot4]-3$$
$$h_{ext} = 6-[3+2+4]-3$$
$$h_{ext} = 6-9-3 = -6$$
$$h_{int} = 3\cdot2 = +6$$
$$0$$

Resposta: ISOSTÁTICA

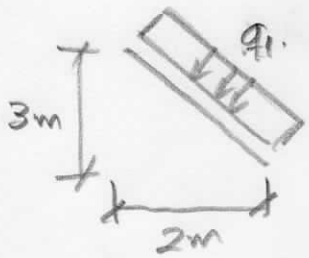
Questão 02:

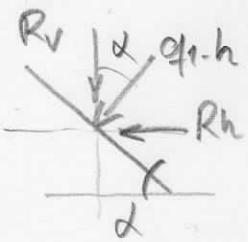
- Calcule as reações de apoio VA E HA do modelo estrutural ao lado dado que:

q1 = 15 kN/m
q2 = 15 kN/m
P1 = 20 kN
P2 = 20 kN



Resposta: VA = 30 kN
HA = 33,333 kN





$$h = \sqrt{3^2+2^2} = \sqrt{13}$$
$$Rv = q1.h.\cos\alpha = 15.\sqrt{13}.\frac{2}{\sqrt{13}} = 30\,kN$$
$$\Sigma Fv = 0\uparrow \quad VA - Rv = 0 \Rightarrow VA = Rv = 30\,kN$$
$$Rh = q1.h.\operatorname{sen}\alpha = 15.\sqrt{13}.\frac{3}{\sqrt{13}} = 45\,kN$$
$$\Sigma M_B = 0 \circlearrowright^{+}$$
$$Rh.1,5 + Rv.2 - 20.3 + 20.4 + 15.3.4,5 - HA.6 - VA.5 = 0$$

$$HA = \frac{1}{6}(45.1,5 + 30.2 - 20.3 + 20.4 + 15.3.4,5 - 30.5)$$

$$HA = 33,333\,kN$$

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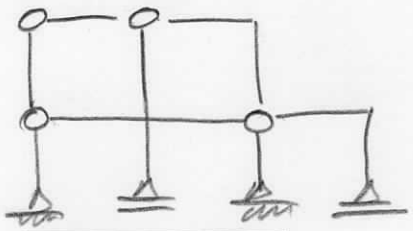
TE14-EAV-B1-1000

Aluno: GABARITO Turma: 3NA

- Consulta livre a cadernos e livros

Questão 01:

- Determine o grau estático do modelo estrutural abaixo:



$h_{ext} = 6 - [(2-1).1 + (3-1).2 + (4-1).1] - 3$

$h_{ext} = 6 - [1 + 4 + 3] - 3$

$h_{ext} = 6 - 8 - 3 = -5$

$h_{int} = 2.3 = +6$

$+1$

Resposta: HIPEREST. +1

Questão 02:

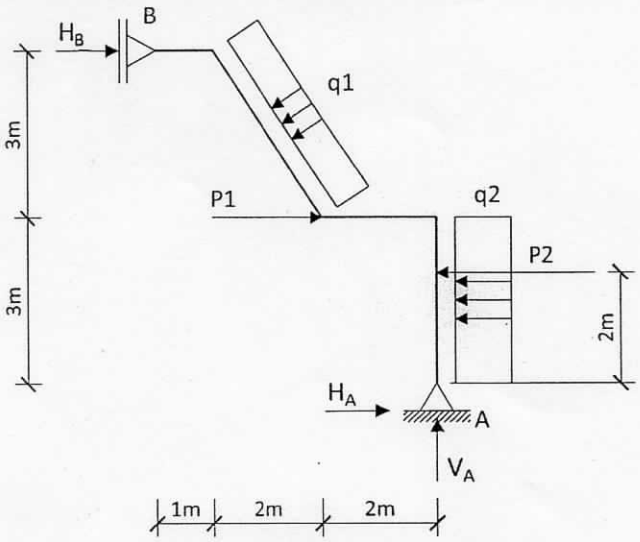
- Calcule as reações de apoio VA E HA do modelo estrutural ao lado dado que:

q1 = 20kN/m

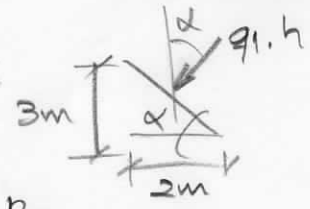
q2 = -10kN/m

P1 = 0kN

P2 = 30kN

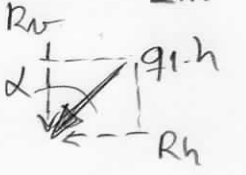


Resposta: VA = 40kN
HA = -7,5kN



$h = \sqrt{3^2 + 2^2} = \sqrt{13}$

$R_v = q_1.h.\cos\alpha = 20.\sqrt{13}.2/\sqrt{13} = 40kN$



$\Sigma F_v = 0 \uparrow\oplus \quad -R_v + V_A = 0 \quad V_A = R_v = 40kN$

$\Sigma M_B = 0 \circlearrowleft\oplus$

$H_A.6 + V_A.5 - 30.4 + 10.3.4,5 - R_v.2 - R_h.1,5 = 0$

$R_h = q_1.h.\sin\alpha = 20.\sqrt{13}.3/\sqrt{13} = 60kN$

$H_A = \frac{1}{6}(-40.5 + 30.4 - 30.4,5 + 40.2 + 60.1,5)$

$H_A = -7,5kN$