Universidade Federal do Rio de Janeiro
Escola Politécnica

DATA / /

GRAUS

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Aluno:

GABARITO - P1 - 2012.1

Disciplina: MEC. SOL. I

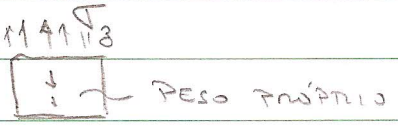
Turma:

Professor:

1ª QUESTÃO (3.5)

EQUILÍBRIO:

$\uparrow_{z=0}$



$$\sigma_z(z)\,A = \int_0^z \rho A g\, dz = \rho A g z$$

$$\sigma_z(z) = \rho g z \rightarrow \sigma(z)\Big|_{MAX} \text{ EM } z = L$$

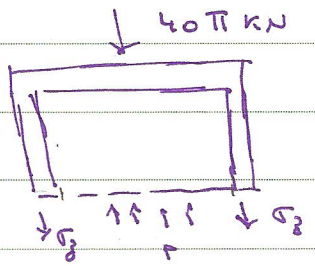
$$\sigma_{MAX} = \rho g L \leq \sigma_{RUPTURA}$$

$$L \leq \frac{200 \times 10^6}{2.800 \times 10}$$

$$\boxed{L \leq 7142{,}9 \text{ m}}$$

2ª. QUESTÃO

\# EQUILÍBRIO NA DIREÇÃO z



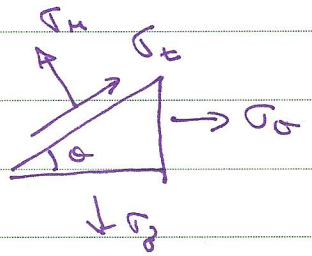
$$\sigma_z \, 2\pi R t + 40\pi K = p\pi R^2$$

$$\sigma_z = \frac{1}{2}\frac{\left(-40K + pR^2\right)}{Rt} = 32 \text{ MPa}$$

\# EQUILÍBRIO EM θ: $\sigma_\theta = \frac{pR}{t} = 68 \text{ MPa}$

\# $\begin{cases} \sigma_r = 0 \longrightarrow \text{TENSÃO PLANA} \\ \sigma_{z\theta} = \sigma_{zr} = \sigma_{r\theta} = 0 \end{cases}$

• PLANO DA SOLDA



$$tg\,\theta = \frac{3}{4}$$

$$\sigma_n = \sigma_\theta \cos^2\theta + \sigma_z \sin^2\theta = 45 \text{ MPa}$$

$$\sigma_t = \sigma_z - \sigma_\theta \sin\theta \cos\theta = 17 \text{ MPa}$$