

N93

Дано:

$$L = 0,12 \text{ м}$$

$$h = 4 \text{ см}$$

$$\rho = 1200 \text{ кг/м}^3$$

$$E = 10^6 \text{ Па}$$

Найти: Δl

Решение:



$$1) \frac{Mg \frac{h-x}{h}}{SE} = \frac{\Delta l_x}{dx} \Rightarrow \frac{Mg}{SE} \left(1 - \frac{x}{h}\right) dx = \Delta l_x$$

$$\Delta l_1 = \frac{Mg}{SE} \left(x - \frac{x^2}{2h}\right) \Big|_0^h \rightarrow \Delta l_1 = \frac{Mg h}{2SE}$$

$$\Delta l_2 = \frac{Mg(L-h)}{2SE}$$

$$\Delta l = \Delta l_2 - \Delta l_1 = \frac{Mg(L-2h)}{2SE} = \frac{\rho L g}{2E} (L-2h) \approx 3 \cdot 10^{-2} \text{ мм}$$

N94

Дано:

$$\Delta T = 100 \text{ К}$$

$$\alpha = 1,2 \cdot 10^{-5} \text{ К}^{-1}$$

$$E = 2 \cdot 10^{11} \text{ Н/м}^2$$

Найти: P

Решение:

$$1) \Delta l = \alpha \Delta T$$

$$2) P = \sigma = \epsilon E = \frac{\Delta l}{l} E = E \alpha \Delta T = 2,4 \cdot 10^8 \text{ Па}$$

N95.

Дано:

$$l = 0,1 \text{ м}$$

Решение:

$$F = 2 \text{ Н}$$

$$2) l = 2 \text{ л}$$

$$0,2$$

$$\sqrt{\frac{7800}{\dots}}$$

$$\rho = 7800 \text{ кг/м}^3$$

$$E = 2 \cdot 10^{11} \text{ Н/м}^2$$

$$T_{\text{тр}} = 2 \cdot 10^8 \text{ Н/м}^2$$

Найти: t , v_{max}

$$1) C = \sqrt{\frac{E}{\rho}}; \quad 2) t = \frac{L}{C} = 4 \cdot 10^{-5} \text{ с}$$

$$\approx 4 \cdot 10^{-5} \text{ (с)}$$

$$2) \oint \sigma \cdot t = \rho S L \cdot v \rightarrow v = \frac{\sigma \cdot t}{\rho L \cdot 2} \approx 5 \text{ м/с}$$

N 96

Дано:

$$R = 10^{-1} \text{ м}$$

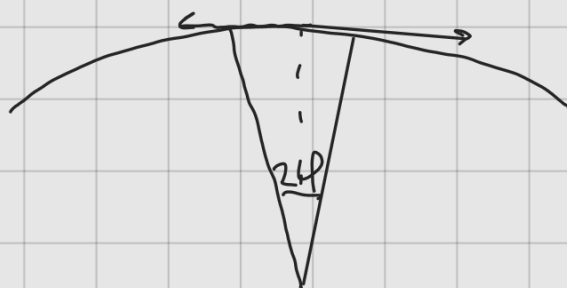
$$\omega = 400 \text{ с}^{-1}$$

$$E = 2 \cdot 10^{11} \text{ Па}$$

$$\rho = 7800 \text{ кг/м}^3$$

$$T_{\text{тр}} - ? \quad \Delta d - ?$$

Решение:



$$1) \frac{2 F \cos \varphi}{S} = E \cdot \frac{\Delta D}{D}$$

$$2 F \sin \varphi = \Delta m \cdot a$$

$$2 \pi \cancel{f} = \frac{\rho \cdot \pi D \cdot \delta \cdot D \cdot a}{E \Delta D} \rightarrow 2 E \Delta D = \rho D^2 a = \rho D^2 4 \pi^2 R \omega^2$$

$$\Delta D = \frac{\rho \cdot 4 R^2 \cdot 4 \pi^2 \omega^2}{2 E} = \frac{8 \rho \cdot \pi^2 R^3}{E}$$

$$\approx 0,49 \text{ мм.}$$

$$2) T_{\text{тр}} = \frac{\Delta D}{D} \cdot E = 4,9 \cdot 10^8 \text{ (Па)}$$

