N 15 PAG 587

$M = 0{,}004\ N\,m \qquad \theta = \pi\ rad.$

cilindro = c $\qquad m_c = 100\ g \qquad r = 3{,}0\ cm$

periodo delle piccole oscillazioni angolari ?

$$T = \frac{2\pi}{\omega} \qquad \omega = \sqrt{\frac{K}{I}}$$

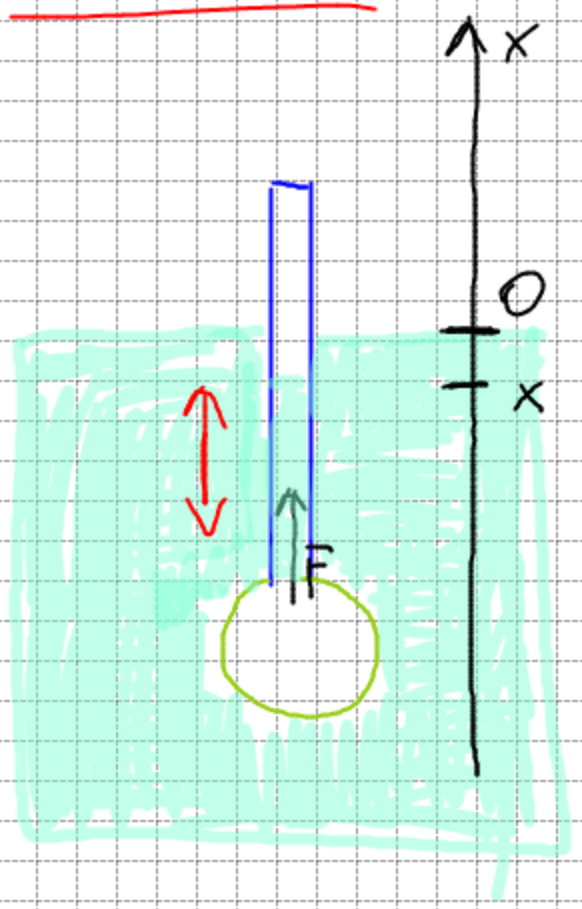
$$M = K\theta \qquad K = \frac{M}{\theta} \qquad K = \frac{0{,}004\ N\,m}{\pi\ rad.} = 1{,}27 \times 10^{-3}\ \frac{N\,m}{rad}$$

$$I = \frac{1}{2} m R^2 \qquad I = \frac{1}{2}\left(100 \times 10^{-3}\ kg\right)\left(3{,}0 \times 10^{-2}\ m\right)^2 = 4{,}5 \times 10^{-5}\ kg\,m^2$$

$$\omega = \sqrt{\frac{K}{I}} \qquad \omega = \sqrt{\frac{1{,}27 \times 10^{-3}\ N\,m/rad}{4{,}5 \times 10^{-5}\ kg\,m^2}} = 5{,}31\ Hz$$

$$T = \frac{2\pi}{\omega} = 1{,}18\ s \simeq 1{,}2\ s$$

N 16 PAG. 589



$Q = 4{,}0\ cm^2$

$m = 180\ g$ $\qquad T = ?$

$d = 1{,}0\ g/cm^3$

$F = mg = -d_{cie} Q g x = -Kx \quad con\ K = d_{cie} Q g$

$d_{cie} Q g \simeq d_{H_2O} Q g$

$$T = 2\pi\sqrt{\frac{m}{K}} = 2\pi\sqrt{\frac{m}{d_{H_2O} Q g}} =$$

$$= 2\pi\sqrt{\frac{180\,g}{1{,}0\times10^{6}\,g/m^3 \cdot 4{,}0\times10^{-4}\,m^2 \cdot 9{,}8\,m/s^2}} =$$

$= 1{,}3\ s.$

N 63

sol	$l_{sol} = 30$ cm (L_0)	$f_{sol} = 196$ Hz (f_0)
la		$f_{la} = 220$ Hz (1)
si		$f_{si} = 247$ Hz (2)
do		$f_{do} = 262$ Hz (3)
re		$f_{re} = 294$ Hz (4)

$$f_0 = \frac{v}{2L_0} \qquad v = 2f_0L_0$$

$$f_i = \frac{v}{2L_i} \qquad f_i = \frac{2f_0L_0}{2L_i} \qquad f_i = \frac{f_0L_0}{L_i}$$

$$\boxed{L_i = \frac{f_0L_0}{f_i}}$$

$$L_1 = \frac{5880}{220}\text{ cm} = 26{,}72\text{ cm}$$

$$\Delta L_1 = L_0 - L_1 = (30 - 26{,}72)\text{ cm} = 3{,}3\text{ cm}$$