densidades corcho 256,77 Kg/m³
agua 1000 Kg/m³

m = 0,0168 Kg

diametro = 5 cm → radio = 0,025 m = $\frac{1}{40}$ m

b.

$$m\ddot{y} = 10^3 \frac{4}{3}\pi\left(\frac{1}{40}\right)^3 g - mg - \frac{1}{2}\cdot 0{,}47\cdot\pi\cdot\left(\frac{1}{40}\right)^2\cdot 10^3\cdot \dot{y}^2$$

$$m\ddot{y} = -0{,}4614\,\dot{y}^2 + 0{,}47703$$

$$y(t) = 0{,}0364109\,\ln\left(C_1 + e^{55{,}8512t}\right) + C_2 - 1{,}0168t$$

$$\dot{y}(t) = \frac{2{,}033592458\,e^{55{,}8512t}}{C_1 + e^{55{,}8512t}} - 1{,}0168$$

$$\dot{y}(t=0) = 0 = \frac{2{,}033592458}{C_1 + 1} - 1{,}0168$$

$$C_1 = 0{,}999992582\,6$$

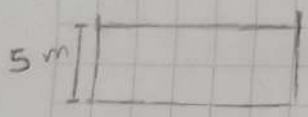
$$y(t=0) = -5 = 0{,}0364109\,\ln(0{,}999992582\,6 + 1) + C_2$$

$$C_2 = -5{,}025237978$$

$$t_5 = 4{,}94225 \rightarrow \dot{y}(t_5) = 1{,}01679$$

$V_0 = \frac{4}{3}\pi (0,1)^3$ masa = 1 kg

c $P = 1000 \left[\frac{kg}{m^3}\right] \cdot g \left[\frac{m}{s^2}\right] \cdot x [m] + 101325$ Pa



$\frac{4}{3}\pi \cdot 10^{-3} [5000g + 101325] = V [1000gx + 101325]$

$V = \frac{4}{3}\pi \cdot 10^{-3} \cdot \frac{150358,25}{1000gx + 101325}$

$m\ddot{y} = 1000 \frac{kg}{m^3} \cdot \frac{4}{3}\pi \cdot \frac{150,358,25}{1000gy + 101325} g - mg$

$\ddot{y} = \frac{4}{3}\pi \frac{150358,25}{10^3 gy + 101325} \frac{g}{m} - g$