

Answer on Question #46496-Physics-Molecular Physics-Thermodynamics

The mass of a bottle of Pepsi is $m = 719.8 \text{ gm} = 0.7198 \text{ kg}$. If the soda volume is $V = 746.1 \text{ ml} = 0.7461 \text{ l} = 0.7461 \cdot 10^{-3} \text{ m}^3$ and the weight of the empty bottle is $W = 1.8 \text{ N}$. Calculate the density of the Pepsi in $\frac{\text{kg}}{\text{m}^3}$.

Solution

The mass of Pepsi is

$$m_{\text{Pepsi}} = m - m_{\text{bottle}},$$

where $m_{\text{bottle}} = \frac{W}{g}$ is the mass of the empty bottle.

The density of the Pepsi is

$$\rho = \frac{m_{\text{Pepsi}}}{V} = \frac{m - \frac{W}{g}}{V} = \frac{0.7198 \text{ kg} - \frac{1.8 \text{ N}}{9.8 \frac{\text{m}}{\text{s}^2}}}{0.7461 \cdot 10^{-3} \text{ m}^3} = 718.6 \frac{\text{kg}}{\text{m}^3}.$$

Answer: $718.6 \frac{\text{kg}}{\text{m}^3}$.