Answer on Question #69884-Physics-Other

A .0132-kg seashell of density p=3.54(10^3) kg/m^3 is suspended by a thread from a spring scale. The seashell is then lowered into seawater until it is completely submerged. If the scale is calibrated in units of newtons, what is the reading of the scale?

Solution

$$V = \frac{m}{\rho}.$$

$$F_{net} = mg - \rho_{seawater} gV$$

$$\rho_{seawater} = 1020 \frac{kg}{m^3}$$

$$F_{net} = mg - \rho_{seawater} g \frac{m}{\rho} = mg\left(1 - \frac{\rho_{seawater}}{\rho}\right)$$

$$F_{net} = (0.0132)(9.81)\left(1 - \frac{1020}{3540}\right) = 0.0922\ N.$$

Answer: $\mathbf{0.0922}\ \boldsymbol{N}$.