

Answer to Question #70624, Physics / Mechanics | Relativity

Question:

Body floats with 1/3 of its volume outside water and 3/4 of its volume outside another liquid the density of the liquid is

Solution:

We assume that 1/3 of the volume of the body is outside the water, and we can write the following:

$$Mg = \rho_w g V_w = \rho_w g \left(1 - \frac{1}{3}\right) V = \frac{2}{3} \rho_w g V$$

Where V is the volume in the body and M is the mass of the body.

For the other liquid we can write

$$Mg = \rho_l g V_l = \rho_l g \left(1 - \frac{3}{4}\right) V = \frac{1}{4} \rho_l g V$$

But the mass of the body is constant so

$$\frac{2}{3} \rho_w g V = \frac{1}{4} \rho_l g V$$
$$\rho_l = \frac{8}{3} \rho_w = 2666 \frac{\text{kg}}{\text{m}^3}$$