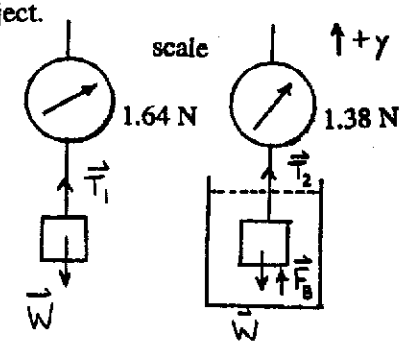
B1. A small object of weight 1.64 N has an apparent weight on the scale of 1.38 N when completely submerged in water. Calculate the volume of the object.
Density of water: 1000 kg/m^3.

so $V_{dis} = V_{obj}$



when submerged, $\sum \vec{F}_y = 0$

$$T_2 + F_B - W = 0$$

and $F_B = W_{dis} = \rho_L g V_{dis} = \rho_L g V_{obj}$

$$\therefore \; T_2 + \rho_L g V_{obj} - W = 0$$

$$V_{obj} = \frac{W - T_2}{\rho_L g} = \frac{1.64\,N - 1.38\,N}{(1000\,kg/m^3)(9.80\,m/s^2)} = \boxed{2.65 \times 10^{-5}\,m^3}$$

B2. A car is moving at 35.0 m/s and approaches a stationary whistle that is emitting a 220-Hz sound. If the speed of sound in air is 343 m/s, what is the frequency heard by the driver?

moving observer:

$$f' = f\left(1 + \frac{v_o}{v}\right)$$

$$f' = 220\,Hz\left(1 + \frac{35.0\,m/s}{343\,m/s}\right) = \boxed{242\ Hz}$$