A rock weighs 130 N in air and has a volume of 0.00331 m3. What is its apparent weight when submerged in water? The acceleration of gravity is 9.8 m/s2 .

When the rock is weighted in the water, two forces acts on a rock: Archimedes force (up) and gravity (down). So its weight will be equal to the total of this two forces:

$$P_w = F_g - F_A = Mg - \rho_w gV = P - \rho_w gV$$

Where ρ_w – water's density; P – rock's weight in air.

$$P_w = 130N - 1000kg/m^3 * 9.8m/s^2 * 0.00331m^3 = 97.562N$$

Answer: $P_w = 97.562N$