MEMS0071 - Introduction to Fluid Mechanics
Quiz #1

Problem #1

James Cameron hold the record for the deepest descent in the ocean - 10,908 meters. Taking the density of sea water to be a constant 1,023 [kg/m^3], what was the pressure experienced at this depth? Report your answer in [MPa].

The pressure experienced at this depth is simply that due to the hydrostatic force of the water. We can neglect atmosphere, for the submersible would be pressured to atmospheric pressure for there are human occupants:

$$P = \rho g h = (1,023\,[\text{kg/m}^3])(9.81\,[\text{m/s}^2])(10,908\,[\text{m}]) = 109,468,652.04\,[\text{Pa}] = 109.5\,[\text{MPa}]$$

The tolerance on the reported answer was set to ± 1 [MPa] to account for any rounding.