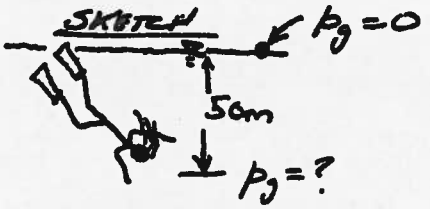
 Name: SOLUTION

CE 3305 Water Systems Design
Quiz 4
Spring 2014

1. Some divers can go as deep as 50 meters on a breath-hold dive[1]. What is the gage pressure at this depth in fresh water? Assume the temperature is 20°C.



KNOWN

$\Delta h = 50m$ $\quad p_0 = 0$ gage

FRESH WATER $\gamma = 9800 N/m^3$

GOVERNING EQUATIONS

$p = \gamma g h$

UNKNOWN

$p_{50} = ?$

SOLUTION

APPLY $p = \gamma g h$; CONVERT UNITS TO Pa OR kPa

$$p = \underbrace{p_0}_{0 \text{ gage}} + \gamma g h = \frac{9800 N}{m^3}(50m) = 490{,}000 \frac{N}{m^2} = 490 kPa$$

[1] A breath-hold dive is when the diver takes a breath at the surface and then holds their breath during the dive. Well trained divers can stay submerged nearly 5 minutes, more if they hyperventilate before the dive. To get to 50 meters, they usually use a weighted sled. The pressure in their lungs is at atmospheric, unlike SCUBA where the pressure is the same as the surrounding water.