Name: _____Date: _____ Class: _____

Practice Problems Worksheet

Show complete solutions to the following problems and box final answers with units.

1. **A sample of an unknown material weighs 300 N in air and 200 N when submerged in an alcohol solution with a density of 0.70 x 10^3 kg/m^3. What is the density of the material?**

2. **A 40-cm tall glass is filled with water to a depth of 30 cm.**
   a. **What is the gauge pressure at the bottom of the glass?**
   b. **What is the absolute pressure at the bottom of the glass?**

3. **Water circulates throughout a house in a hot water heating system. If the water is pumped at a speed of 0.50 m/s through a 4.0-cm diameter pipe in the basement under a pressure of 3.03x10^5 Pa, what will be the velocity and pressure in a 2.6-cm diameter pipe on the second floor 5.0 m above?**

4. **The small piston of a hydraulic lift has an area of 0.20 m^2. A car weighing 1.2 x 10^4 N sits on a rack mounted on the large piston. The large piston has an area of 0.90 m^2. How large force must be applied to the small piston to support the car?**

5. **Calculate the absolute pressure at an ocean depth of 1.0 x 10^3 m. Assume that the density of the water is 1.025 x 10^3 kg/m^3 and that P_0 = 1.01 x 10^5 Pa.**

6. **A water tank has a spigot near its bottom. If the top of the tank is open to the atmosphere, determine the speed at which the water leaves the spigot when the water level is 0.5 m above the spigot.**