**AP CHEM WORKSHEET ON PRESSURE**

Name:_____Date:_____Period:___

(1) Convert each pressure to the equivalent pressure in atmospheres:

a. 1127 mm Hg

b. 6.78 $kg/cm^2$

c. 231 kPa

d. 912 mb

e. $2.35 \times 10^5$ $N/m^2$

(2) Explain why the height of mercury in a mercury barometer is independent of the diameter of the mercury column.

(3) A 'friend' of Mr. Winter's weighing 100**.** pounds and wearing high heeled shoes momentarily places all of her weight on one heel on his hand. If the area of the heel is 0.300 $in^2$, calculate the pressure exerted on his hand in kPa.

(4) How high in meters must a column of water be to exert a pressure equal to that of a 760**.** mm column of mercury? The density of water is 1.00 g/mL and the density of mercury is 13.6 g/mL.

(5) What is the pressure in atmospheres on the body of a diver if he is 25.0 ft below the surface of the water when the atmospheric pressure at the surface is 0.970 atm? (HINT: don't forget to add the two pressures together)

(6) Calculate the height in meters of a column of liquid glycerol (Density = 1.26 g/cm$^3$) required to exert the same pressure as 2.82 meters of $CCl_{4\ (l)}$ (Density = 1.59 g/cm$^3$).

(7) Calculate the height of liquid benzene in meters required to exert a pressure of $2.09 \times 10^4$ N/m$^2$. The density of liquid benzene is 0.879 g/cm$^3$.

(8) Calculate the density of a liquid in g/cm$^3$ , if a 15.0 ft column of the liquid exerts a pressure of 12.5 lb/in$^2$.

(9) The mercury level in the open arm of an open arm manometer is 283 mm above a reference point. In the arm connected to a cylinder of gas, the level is 38 mm above the same reference point. If barometric pressure is 29.67 inches of mercury, what is the total pressure of the gas in the cylinder?

(10) The open end manometer pictured in your notes is filled with glycerol (Density = 1.261 g/mL). Calculate the pressure, in torr, of the gas in the container if atmospheric pressure is 722 torr and the glycerol level on the right side is 22.7 centimeters below that on the left side.

(11) The maximum working pressure (MWP) of a scuba tank is a rating that represents the highest pressure the tank can safely hold at a given temperature. If the person filling the tank exceeds this pressure, he or she is legally liable to the diver who uses it if an accident occurs. The MWP for a tank with certain valves and fittings is 207.0 bar at 20.0 $^0$C. What is that pressure in lb/in$^2$?

**AP CHEM WORKSHEET ON PRESSURE ANSWER KEY**

**(1)** **a.** **1.483 atm**

**b.** **6.56 atm**

**c.** **2.28 atm**

**d.** **$9.12 \times 10^{-6}$ atm**

**e.** **2.32 atm**

**(2)** **The larger the diameter of the Hg column, the greater the mass of Hg and also the total force exerted by the Hg column. However, this force is distributed over a larger cross-section area, so the ratio of the force/area (the pressure) is the same as that of a smaller diameter column. So the same length Hg column is required to balance atmosphere pressure, regardless of the diameter of the column.**

**(3)** **$2.30 \times 10^{3}$ kPa**

**(4)** **10.3 m**

**(5)** **1.71 atm**

**(6)** **3.56 atm**

**(7)** **2.43 m**

**(8)** **1.92 g/mL**

**(9)** **999 mmHg**

**(10)** **701 torr**

**(11)** **$3.04 \times 10^{-2}$ lb/in$^2$**