Honors Chemistry – Gas Laws Worksheet Key

1. Determine the pressure in torr and kPa on a day when the pressure is .96atm.

torr = (.96atm)(760torr/atm) = 729.6 = **730torr**
kPa = (.96atm)(101.3kPa/atm) = **97kPa**

2. A reaction occurs in which a gas is produced causing the mercury column in an open-end manometer to be 125mm higher on the side of the sample gas. If the prevailing atmospheric pressure is .97atm, what is the pressure of the gas in Pascal's?

P_{gas} = (.97atm)(760mmHg/atm) – 125mmHg = 612.2torr
612.2torr(101,300Pa/760torr) = **8.2×10^4Pa**

3. Determine the pressure of a sample gas in an open-end manometer in which the mercury column is 25.0mm higher on the sample gas side and the prevailing atmospheric pressure is .97 atm. Give your final answer in Pascal's.

P_{gas} = (.97)(760) - 25 = 712.2torr
712.2torr(101,300Pa/760torr) = **9.5×10^4Pa**

4. A gas, initially at .60atm has its volume decreased to 1/3 its original amount. Determine the final pressure in torr.

$P_1V_1 = P_2V_2$ $P_2 = (.60)(V_1)/(1/3\ V_1)$ = 1.8atm
1.8atm(760torr/atm) = 1368torr = **1.4×10^3torr**

5. A 1.50L container of gas, initially at 25.0°C has its temperature increased to 50.0°C. What is the final volume of the gas if P and n are held constant?

$V_1/T_1 = V_2/T_2$ $V_2 = (1.50)(273.15+50)/(273.15+25)$ = **1.63L**

6. Determine the pressure of a gas in pascals if 2.00moles of that gas are sealed in a 500.mL container at 30.°C.

P = nRT/V = (2.00)(.0821)(303.15)/(.500) = 99.55atm
99.55atm (101,300Pa/1atm) = **1.01×10^7Pa**

7. Determine how many moles of gas are contained in a sealed 650.mL container at 700. torr and 25°C.

n = PV/RT = (700./760)(.650L)/(.0821)(25 + 273.15) = **.0245mol**

8. Determine the volume of 1 mole of a gas at STP.

V = nRT/P = (1)(.0821)(273.15) / (1) = **22.4L (standard molar volume)**