**Homework #14 Chemistry 1114 due Friday 10 Nov 2017 12 pts (in class) Show your work !!**

**Your name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**1) What gas quantity is held constant in the Combined Gas Law ?**

**gas moles (n)**

**2) A sample of O2 gas at constant temperature initially occupies a volume of 6 L at a**

 **pressure of 2 atm. What is the pressure if the volume increases to 12 L ? (2 pts)**

**P1V1=P2V2**

**6\*2= P2\*12=> P2 = 1 atm \_\_1\_\_\_\_\_atm =P2**

**3) A sample of He initially at 300 K occupies 6 L at 0.5 atm. What must the new temperature be if the volume decreases to 2 L and pressure of 1 atm ? (2 pts)**

**P1V1=P2V2**

 **T1 T2**

**0.5\*6 = 1\*2**

 **300 T2**

**T2 =2\*300/3= 200 K \_\_200\_\_\_\_K = T2**

**4) An unknown gas can have one of six identities:**

**O2 N2 CO2 H2O SO2 H2**

**MW 32 28 44 18 64 2**

**A 1.0 gram sample of the gas occupies 1.00 L at 300 K and a pressure of 0.879 atm. Which gas are you working with and why (show work.)**

**n=PV/RT= 0.879\*1/(0.08206\*300) =0.03571 mol**

**convert 1.00 g of the gas to moles using the various MW above:**

**O2 N2 CO2 H2O SO2 H2**

 **1 1 1 1 1 1**

**32 28 44 18 64 2**

 **n= 0.0312 0.0357 0.0227 0.0555 0.0156 0.5**

 **best match to ideal gas law n prediction \_\_N2\_\_ gas ID**

**5) A nitrogen oxide compound NxOy decomposes to form N2 and O2.**

**The possible choices for the compound are:**

**NO2🡪 ½ N2 + O2**

**NO 🡪 ½ N2 + ½ O2**

**N2O4 🡪 N2 + 2O2**

**The magic Ideal Gas fairy informs you that 1 mole of the mystery gas decomposes to N2 and O2 which then occupies 73.854 L at 1 atm and 300 K. What is the identity of the original NxOy compound and why ? (show work on back side)**

**n= PV/RT= 1\*73.854/(0.08206\*300)=3 moles of gas from decomposition.**

**1 mol N2O4=> 3 mol( N2 + O2) N2O4 is the mystery gas \_\_\_N­2O4\_\_\_\_ NxOy ID**