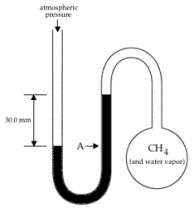
Dougherty Valley HS Chemistry - AP
Gas Laws – Extra Practice

Worksheet #10*

Name: **Period:** **Seat#:**

Directions: Any worksheet that is labeled with an * means it is suggested extra practice. We do not always have time to assign every possible worksheet that would be good practice for you to do. You can do this worksheet when you have extra time, when you finish something early, or to help you study for a quiz or a test. If and when you choose to do this Extra Practice worksheet, please do the work on binder paper. You will include this paper stapled into your Rainbow Packet when you turn it in, even if you didn't do any of this. We want to make sure we keep it where it belongs so you can do it later if you want to (or need to). If you did the work on binder paper you can include that in your Rainbow Packet after this worksheet. If we end up with extra class time then portions of this may turn into required work. If that happens you will be told which problems are turned into required. Remember there is tons of other extra practice on the class website…and the entire internet! See me if you need help finding practice on a topic you are struggling with.

1) A sample of CH_4 is confined in a water manometer. The temp of the system is 30.0 °C and the atmospheric pressure is 98.70 kPa. What is the pressure of CH_4, if the height of the water in the manometer is 30.0 mm higher on the confined gas side than on the open to the atmosphere side. (Density Hg = 13.534 g/mL) *94.2 kPa*



2) Three 1.00 L flasks at 25.0 °C and 1013 hPa pressure contain: CH_4 (flask A), CO_2 (flask B) and NH_3 (flask C). Which flask (or none) contains 0.041 mol of gas? *All flasks*

3) What is height (in mm) of a column of methane if the pressure at the base of the column is 1.50 atm? (The density of Hg is 13.534 g/cm^3 and methane is 0.717 kg/m^3.) *2.15×10^7 mmCH_4*

4) Calculate K_p for each of the two reactions (happening in the same flask):
$2\ FeSO_4\ (s) \rightarrow Fe_2O_3\ (s) + SO_3\ (g) + SO_2\ (g)$
$SO_3\ (g) \rightarrow SO_2\ (g) + \frac{1}{2}\ O_2\ (g)$
After equilibrium is reached, P_{total} is 0.836 atm and partial pressure of oxygen is 0.0275 atm. *0.218*

5) The vapor pressure of solid iodine at 30.0 °C is 0.466 mmHg.
   a. How many milligrams of iodine will sublime into an evacuated 1.00 L flask? *6.26 mg*
   b. If 2.00 mg of I2 are used, what will the final pressure be? *0.149 mmHg*
   c. If 10.00 mg of I2 are used, what will the final pressure be? *0.466 mmHg*

6) A gas has a pressure of 4.62 atm when its volume is 2.33 L. What will be the pressure in torr when the volume is changed to 1.03 L? *7940 torr*

7) A sample of hydrogen at 47°C exerts a pressure of 0.329 atm. The gas is heated to 77°C at constant volume. What will be its new pressure? *0.360 atm*

8) A weather balloon at Earth's surface has a volume of 4.00 L at 31°C and 755 mm Hg. If the balloon is released and the volume reaches 4.08 L at 728 mm Hg, what is the temp in degrees Celsius? *26°C*

9) How big a volume of dry oxygen gas at STP would you need to take in order to have the same number of oxygen molecules as there are hydrogen molecules in 25.0 L at 0.850 atm and 35°C? *18.8 L*

10) At a deep-sea station 200.0 m below the surface of the Pacific Ocean, workers live in a highly pressurized environment. How many liters of gas at STP must be compressed on the surface to fill the underwater environment with 2.00 x 107 L of gas at 20.0 atm? *4.00×10^8 L*

11) One method of estimating the temperature of the center of the sun is based on the assumption that the center of the sun consists of gases that have an average molar mass of 2.00 g/mol. If the density of the center of the sun is 1.40 g/cm^3 at a pressure of 1.30×10^9 atm, calculate the temperature in degrees Celsius. *2.26×10^7 °C*

12) The nitrogen in a 30.0 L container at 740 torr and 55°C and the hydrogen in a 20.0 L container at 650 torr and 15°C are pumped into a 25.0 L container at 32°C. What is the final pressure? *1376 torr*

13) I have a special, ideal balloon. This balloon does not exert any pressure on the gas inside it. I start by taking the balloon and inflating it to 4 L in Wilmington DE last night. The weather channel said that the temperature was 45.0 °F, and the pressure was 30.27 inches of Hg.
   a. First, I take the balloon scuba diving and go down to a depth of 100 ft where the pressure is 7 atm. and the temp is 54.2 °F. What is the volume of the balloon? *7 L*
   b. Next I take the balloon out to Colorado. In Denver when I arrive at the airport the temp is 68.4 °F and the barometric pressure is 640 mmHg. Now what size is the balloon? *5.03 L*
   c. Next is a hike up to the top of Longs Peak (14,256 ft) where the pressure is 470 torr and the temperature is -20°C. Now what size is the balloon? *5.91 L*
   d. Next, I take the balloon on an airplane trip home and let it out the window. The 747 is flying at 40,000 ft where the pressure is 80.0 torr and the temp is -60.0 °C. What is the volume of the balloon here? *29.2 L*
   e. And last of all the balloon soars up into the stratosphere where the pressure has dropped to 0.8 torr and the temperature is 0°C, what size is it just before it pops? *3743 L*