Dougherty Valley HS Chemistry
Gas Laws – Basic Gas Law Equations

Worksheet #2

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

Conceptual Questions

1) Summarize the properties of gasses – bullet points are totally fine!		**2)** Summarize the assumptions of KMT – bullet points are totally fine!		
3) What does "Absolute Zero" mean? What unit is it measured in?		**4)** What is the equation to convert from Celsius to Kelvin	**5)** Which molecule will go faster when at the same temperature – H_2 or N_2 ? Why?	
6) What does STP stand for? What are the conditions at STP?		**7)** What is the difference between an Ideal Gas and a Real Gas?		
8) If temp. goes ↑ then pressure goes:	**9)** If volume goes ↑ then pressure goes:	**10)** If pressure goes ↑ then volume goes:	**11)** If temp. goes ↓ then volume goes:	**12)** If moles of gas goes ↑ then volume goes:

Mathematical Questions

- Identify the variables involved
- Identify the equation that you will be using – formula AND the name!
- Show plugging in the variables to the correct places in the equation
- Get an actual answer, including units! Box your answer!
- Don't forget - you must show units and any conversions that might be involved.
- You can either rearrange your equation before you plug in your variables, or after. Do what works for you!

13) 1.00 L of a gas at standard temperature and pressure is compressed to 473 mL. What is the new pressure of the gas? *2.11 atm*

Variables

P_1 = 1 atm
P_2 = ?
V_1 = 1.00 L
V_2 = 473 mL
= 0.473 L

Equation Name: *Boyle's Law* Equation Formula: $P_1V_1=P_2V_2$

14) A sample of gas at 3.00 x 10^3 mm Hg inside a steel tank is cooled from 500.0 °C to 0.00 °C. What is the final pressure of the gas in the steel tank? *1.06 x 10^3 mmHg*

Variables Equation Name: _____ Equation Formula: _____

15) The temperature inside my refrigerator is about 4.00^0 C. If I place a balloon in my fridge that initially has a temperature of 22.00^0 C and a volume of 0.500 L, what will be the volume of the balloon when it is fully cooled by my refrigerator? *0.47 L*

Variables Equation Name: _____ Equation Formula: _____

16) If a balloon already has 0.05 moles of helium gas in it and has a volume of 500mL, how many moles of gas would it be holding if it ends up 1.2 L in size? *0.12 moles*

Variables Equation Name: _____ Equation Formula: _____

17) Synthetic diamonds can be manufactured at pressures of 6.00 x 10^4 atm. If we took 2.00 liters of gas at 800mmHg and compressed it to a pressure of 6.00 x 10^4 atm, what would the volume of that gas be? *3.5 x 10^{-5} L*

Variables Equation Name: _____ Equation Formula: _____

18) If I initially have a gas at a pressure of 12 atm, a volume of 23 liters, and a temperature of 200 K, and then I raise the pressure to 14 atm and increase the temperature to 300 K, what is the new volume of the gas? *29.57 L*

Variables Equation Name: _____ Equation Formula: _____

19) Calculate the final pressure (in psi) inside a scuba tank after it cools from 1.00×10^3 °C to 25.0 °C. The initial pressure in the tank is 130.0 atm. *447 psi*

Variables Equation Name: _____ Equation Formula: _____

20) In a thermonuclear device, the pressure of 0.050 L of gas within the bomb casing reaches 4.0×10^6 atm. When the bomb casing is destroyed by the explosion, the gas is released into the atmosphere where it reaches a pressure of 1.00 atm. What is the volume of the gas after the explosion? *2.0×10^5 L*

Variables Equation Name: _____ Equation Formula: _____

21) On hot days, potato chip bags seem to "inflate", even though they have not been opened. If a 250.0 mL bag is at a temperature of 19.0^0C, and I leave it in my car, which has a temp of 60.0^0 C, what will the new volume of the bag be? *0.285 L*

Variables Equation Name: _____ Equation Formula: _____

22) A soda bottle is flexible enough that the volume of the bottle can change even without opening it. If you have an empty 2.00 L soda bottle at room temp (25.0^{0}C), what will the new volume be if you put it in your freezer (-4.00 ^{0}C)? *1.81 L*

Variables Equation Name: _____ Equation Formula: _____

23) The temperature of a sample of gas in a steel container at 30.0 kPa is increased from -100.0 °C to 1.00 x 10^3 °C. What is the final pressure inside the tank? *220.8 kPa*

Variables Equation Name: _____ Equation Formula: _____

24) The temperature of a sample of gas in a steel container at 25.0 kPa starts at -50 °C and decreases by a factor of three. What is the final pressure inside the tank? *8.33 kPa*

Variables Equation Name: _____ Equation Formula: _____

25) 500.0 mL of a gas was collected at 20.0 °C and 720.0 mm Hg. What is its volume at STP? *0.441 L*

Variables Equation Name: _____ Equation Formula: _____

26) A gas that has a volume of 28 liters, a temperature of 45 ^{0}C, and an unknown pressure has its volume increased to 34 liters and its temperature decreased to 35 ^{0}C. If I measure the pressure after the change to be 2.0 atm, what was the original pressure of the gas? *2.5 atm*

Variables Equation Name: _____ Equation Formula: _____

27) If the absolute temperature of a given quantity of gas is doubled and the pressure tripled, what happens to the volume of the gas? *Will decrease by 1/3*

Variables Equation Name: _____ Equation Formula: _____

28) A cylinder with a moveable piston contains 2.00 g of helium at room temperature. More helium was added to the cylinder and the volume was adjusted so that the gas pressure remained the same. How many grams of helium were added to the cylinder if the volume was changed from 2.00 L to 2.70 L? *0.7 g*

Variables Equation Name: _____ Equation Formula: _____

29) You have two containers at STP. Flask #1 contains F_2 gas and flask #2 contains CO_2 gas. What can you say about the number of moles of molecules in each flask, and what can you say about the average speed of the molecules in each flask? (In other words compare Flask #1 to Flask #2 – think about terms such as more, less, same, faster, slower, etc)