

**Unit 10 – Chapter 5: Gas Laws**

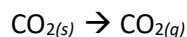
Name \_\_\_\_\_

**Take Home Quiz #2**

Period \_\_\_\_\_

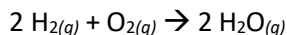
- 1) Freon-12 ( $\text{CF}_2\text{C}_{12}$ ) is commonly used as the refrigerant in central home air conditioners. The system is initially charged to a pressure of 70 psi. Express this pressure in each of the following unit. (Remember: 1 atm = 14.7 psi.)
- mm Hg
  - atmospheres
  - Pascals
  - kilopascals
- 2) An ideal gas is contained in a cylinder with a volume of 500 mL at a temperature of  $30.0^\circ\text{C}$  and a pressure of 710 torr. The gas is compressed to a volume of 25 mL and the temperature is raised to  $820^\circ\text{C}$ . What is the new pressure, in torr, of the gas?
- 3) A 5.0-liter flask contains 0.60 grams of  $\text{O}_2$  at a temperature of  $22^\circ\text{C}$ . What is the pressure, in atmospheres, inside the flask?
- 4) A balloon has a volume of 175 mL at  $19^\circ\text{C}$ . At what temperature, in  $^\circ\text{C}$ , will the volume of the balloon have increased by 25% at a constant pressure?
- 5) Butane reacts with oxygen in the following reaction:
- $$\text{C}_4\text{H}_{10} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} \quad \text{(UNBALANCED)}$$
- If 75.2 grams of butane reacts with 21.2 grams of oxygen, calculate the volume of carbon dioxide produced at  $25^\circ\text{C}$  and 780 torr of pressure.

- 6) A sample containing 15.0 grams of dry ice,  $\text{CO}_{2(s)}$ , is put into a balloon and allowed to sublime according to the following equation:



What will the volume of the balloon be at  $22.0^{\circ}\text{C}$  and 1.04 atm after all the dry ice has sublimed?

- 7) 0.500 liters of  $\text{H}_{2(g)}$  are reacted with 0.600 liters of  $\text{O}_{2(g)}$  at STP according to the equation:

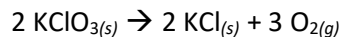


What volume will the  $\text{H}_2\text{O}$  occupy at 1.00 atm and  $350^{\circ}\text{C}$ ?

- 8) At  $0^{\circ}\text{C}$ , a 1.0-liter flask contains 0.005 moles of  $\text{N}_{2(g)}$ , 150 mg  $\text{O}_{2(g)}$ , and  $\text{NH}_{3(g)}$  at a concentration of  $5.0 \times 10^{18}$  molecules/ $\text{cm}^3$ . What is the total pressure of the flask?

- 9) A compound contains only nitrogen and hydrogen, and it is 87.4% nitrogen by mass. A gaseous sample of the compound has a density of 0.977 g/liter at 710.0 torr and  $100.0^{\circ}\text{C}$ . What is the molecular formula of the compound?

- 10) Oxygen gas can be produced in small quantities in the laboratory from the thermal decomposition of potassium chlorate:



If 3.7 grams  $\text{KClO}_3$  is heated, what dry volume of gas will be collected over water at  $27^{\circ}\text{C}$  and 735 torr? (At  $27^{\circ}\text{C}$  the vapor pressure of water is 26.7 torr.)

- 11) Calculate the 1) average kinetic energy and 2) root mean square velocity of  $\text{N}_2$  molecules at 273 K and again at 546 K.