

Unit 10 – Chapter 5: Gas Laws

Name _____

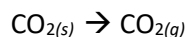
Take Home Quiz #2

Period _____

1. Freon-12 (CF_2C_{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.)
 - a. mm Hg
 - b. atmospheres
 - c. Pascals
 - d. kilopascals
2. An ideal gas is contained in a cylinder with a volume of 500 mL at a temperature of 30.0°C and a pressure of 710 torr. The gas is compressed to a volume of 25 mL and the temperature is raised to 820°C . What is the new pressure, in torr, of the gas?
3. A 5.0-liter flask contains 0.60 grams of O_2 at a temperature of 22°C . What is the pressure, in atmospheres, inside the flask?
4. A balloon has a volume of 175 mL at 19°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:
$$\text{C}_4\text{H}_{10} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} \quad (\text{UNBALANCED})$$

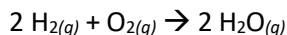
If 75.2 grams of butane reacts with 21.2 grams of oxygen, calculate the volume of carbon dioxide produced at 25°C and 780 torr of pressure.

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°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:

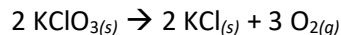


What volume will the H_2O occupy at 1.00 atm and 350°C ?

8. At 0°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 5.0×10^{18} molecules/ 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°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 KClO_3 is heated, what dry volume of gas will be collected over water at 27°C and 735 torr? (At 27°C the vapor pressure of water is 26.7 torr.)

11. Calculate the 1) average kinetic energy and 2) root mean square velocity of N_2 molecules at 273 K and again at 546 K.