**Gas Laws Problem Set**

1. What is the pressure in atmospheres of 0.0233 mol an ideal gas at 27°C in a 52.9 mL container?

2. What is the volume in liters of 2.33 mol of an ideal gas at 27°C at a pressure of 872 torr?

3. What is the temperature in Kelvin of 0.0233 mol of an ideal gas at a pressure of 458 torr and a volume of 1870 mL?

4. How many moles of ideal gas are present in a 347 mL container with a pressure of 3.88 atmospheres at a temperature of 383 °C?

5. An ideal gas initially at a pressure of 0.233 atm in a 5.32 L piston is compressed to a volume of 3.88 L. What is the new pressure of the gas in atmospheres and in torr?

6. An ideal gas initially at a pressure of 459 torr in a 1438 mL piston has its pressure adjusted to 1.79 atm. What is the new volume of the piston in L?

7. An ideal gas initially at a temperature of 18.44°C in a 5.00 L container is heated to 127.33°C. What is the new volume of the container in milliters?

8. An ideal gas initially at a temperature of 345°C and a volume of 478mL is compressed to a volume of 233 mL. What is the new temperature of the gas in Celsius?

9. An ideal gas initially at a temperature of 445K at a pressure of 553 atmospheres is cooled to a temperature of 37°C in a rigid container. What is the new pressure of the gas in the container in atmosphere and torr units?

10. An ideal gas initially at a temperature of 388K and a pressure of 3.87 atmospheres in a 288 mL container is cooled to a temperature of 125K and the pressure is raised to 6.33 atmospheres. What is the new volume of the container in milliliters?

11. If 15.0 moles of an ideal gas has a pressure of 3.55 atmospheres at constant volume and temperature, how many moles of gas will have a pressure of 9.45 atmospheres?

12. What is the density of 55.2 grams of argon gas at a pressure of 3.95 atmospheres and a temperature of 35°C?

13. A mixture of gas have the following partial pressures: 233 torr N2, 353 torr of He and 832 torr of O2. (a) What is the total pressure of the mixture of gases? (b) What are the mole fractions of each of these gases in the mixture?

14. A mixture of gases contains 3.44 mol of He, 1.39 mol of Ne and 7.33 mol of N2. (a) What are the partial pressures of each of these gases if the total pressure is 5.87 atmospheres? (b) What are the mole fractions of each of the gases in the mixture?

15. An antacid tablet is analyzed for %CaCO3 by measuring the pressure, volume and temperature of the CO2 generated by adding acid to the sample according to the reaction:

CaCO3(s) + 2HCl(aq) → CaCl2(aq) + CO2(g) + H2O(l)

A 0.200 gram tablet of antacid produces 34.55 mL of gas at 26.80°C. The gas was collected over water. Water at 26.8°C has a vapor pressure of 26.43 torr. The atmospheric pressure at the time of the analysis was 758.33 torr. What is the %CaCO3 in the antacid sample?

16. What is the density of sulfur dioxide gas at 974 torr and a temperature of 55.7 °C?

17. What pressure is needed to have neon gas at 56.9 °C have a density of 0.555 g/L?

18. An unknown gas has a density of 1.39 g/L at a temperature of 56.8°C and a pressure of 1.35 atmospheres. What is the molar mass of the gas?

19. An unknown gas with a mass of 2.56 g is in a 5.00 L container with a temperature of 345 K and a pressure of 0.0445 atmospheres. What is the molar mass of the gas?

20. A gas has a density of 1.39 g/L a56.8°C and a pressure of 1.35 atmospheres. What density will the gas have if the pressure is changed to 5.33 atmospheres and temperature remains constant?

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