**NAME** _____

INSTRUCTIONS: These problems cover all of the gas laws we've covered so far. Use your calculator and your periodic table. Show your work, keep it neat, & CIRCLE YOUR ANSWER! Just a few helpful hints... R = 0.0821 L-atm / mol-K......1atm=101.3 KPa.

1. A 7.00-L sample of carbon dioxide at 800.0 torr has its pressure increased to 1000.0 torr while its temperature is kept constant. What is the new volume of the CO_2? What law does this represent?

2. A 4.50-L sample of nitrous oxide is warmed at constant pressure from 27.0 °C to 77.0 °C. What volume will the N_2O have at the new temperature? What law does this represent?

3. You have a 155.0-mL sample of argon gas at 24.6 °C and 96.00 kPa. What is the volume at STP?

4. What volume will 40.00 g of ammonia gas occupy at 0.98 atm and 27.0 °C?

5. What volume will 55.20 g of carbon dioxide occupy at 0.98 atm and 27.0 °C?

6.   What is the density of a gas at STP that has a molar mass of 44.0 g/mol?

7.   Compute the volume of 14.55 g of methane at STP.

8.   Determine the density of chlorine gas at 20.0ºC and 2.5 atm.

9.   Calculate the volume 0.881 mol of a as will occupy at STP.

10.   Calculate the volume that 2.0 Kg of methane will occupy at STP.

11.   How many molecules are in a sample of a gas that has a volume of 3.72 L at STP.

12   What volume is occupied by 0.580 mol of a gas at 98.4 KPa and 11.0ºC.

13 We can generate oxygen gas by decomposing potassium chlorate according to the reaction

$KClO_3 \rightarrow KCl + O_2$
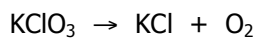
What volume of oxygen will we have at 1.01 atm and 24.0 °C if we decompose 28.20 g of $KClO_3$?

14 What volume of oxygen gas is needed to combust 2.5 L of methane?

15 How many grams of calcium hydride are required to generate 15.0 L of hydrogen gas at STP?
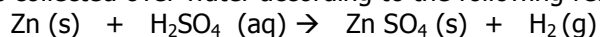
$CaH_2 + H_2O \rightarrow Ca(OH)_2 + 2H_2$
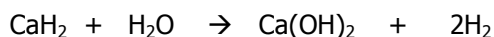
16 Nitrogen gas reacts with hydrogen gas to give ammonia. If 2.5 L of nitrogen gas reacts completely at 2.00 atm and 273 K, how many grams of ammonia are produced?

17 A mixture containing 0.551 moles of CO_2, 1.25 moles of H_2 , and 0.225 moles of O_2 , are combined in a 2.50 L vessel at 125°C. Calculate the total pressure of the mixture.
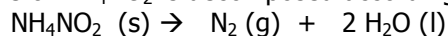
18. A mixture of gas contains 17.5 g of He, 22.5 g of Ne, and 11.7 g of CO_2. If the mixture is combined in a 2.50 L flask at 15°C, what will be the total pressure of the mixture?

19. A gas is collected over water according to the following reaction:
       $Zn (s) + H_2SO_4 (aq) \rightarrow Zn SO_4 (s) + H_2 (g)$
    If 159 mL of gas is collected over water at 24°C and a total pressure of 738 torr, how many grams of Zn were used? (1atm = 760 torr P_{water} at 24°C = 22.38 torr   Don't forget…Zn is a solid, you'll need to find the moles of the gas produced first and then use stoich to find g Zn)

20. A sample of NH_4NO_2 is decomposed according to the following reaction:
       $NH_4NO_2 (s) \rightarrow N_2 (g) + 2 H_2O (l)$
    If 655 mL of gas is collected over water at 24°C and a total pressure of 775 torr, how many moles of N_2gas were produced? 1atm = 760 torr P_{water} at 24°C = 22.38 torr)