1. Calcium carbonate decomposes at high temperatures to form carbon dioxide and calcium oxide:

**CaCO3(s)  CO2(g) + CaO(s)**

How many grams of calcium carbonate will I need to form 3.45 liters of carbon dioxide at STP?

1. Ethylene burns in oxygen to form carbon dioxide and water vapor:

**C2H4(g) + 3 O2(g)  2 CO2(g) + 2 H2O(g)**

How many liters of water can be formed if 1.25 liters of ethylene are consumed in this reaction at STP?

1. When chlorine is added to acetylene, tetrachloroethane is formed:

**2 Cl2(g) + C2H2(g) 🡪 C2H2Cl4(l)**

How many liters of chlorine at STP will be needed to make 75.0 grams of C2H2Cl4?

4. A sample of helium occupies 235 mL at 788 Torr and 25oC. If

the sample is condensed into a 0.115 liter flask, what will the new pressure

be, assuming constant temperature?

5. A sample of hydrogen gas occupies 92 mL at 602oC. If the

pressure is held constant, what volume will the gas occupy when cooled

to 83oC?

6. What is the mass of butane gas, C4H10, that can be held in a

3.00 L container at STP?

7. If a fixed amount of gas occupies 450.0mL at -10.0oC and

191 Torr, what will the volume of the same gas be at 25.0oC and 1142

Torr?

8. A sample of gas in a rigid container is at 25.0oC and 1.00atm.

What is the pressure of the sample when heated to 220.0oC?

9. On a cold day a person takes in a breath of 450.0 mL of air at 756 mmHg and -10.0oC. Assuming that amount and pressure remain constant, what is the volume of the air when it warms to body temperature (37.0oC) in the lungs?

**10.**  If 0.123 g of methane, CH4, is introduced into an evacuated 5.00 liter container at 23oC, what is the pressure, in atmospheres, in the container?

11. A sample of a gas is collected in a flask with a volume of 267 mL at a pressure of 771 mmHg and a temperature of 21oC. If the mass of the gas is 1.05 g, what is the molar mass of the gas?

12. A gas is at 1.33 atm of pressure and a volume of 682 mL. What will the pressure be if the volume is reduced to 0.419 L?

13. Nitrogen gas is being held in a 14.3 L tank at a temperature of 62oC. What will the volume be when the temperature drops to 24oC?

14. A gas storage tank is a 1.72 atm and 35oC. What temperature is the gas at if the pressure increases to 2.00 atm?

15. Find the pressure in mm Hg produced by 2.35 g of carbon dioxide in a 5.00 L flask at 18oC.

16. How many grams of carbon monoxide must be placed into a 40.0 L tank to develop a pressure of 965 mm Hg at 23oC?

17. Calculate the mass of 400. mL of carbon dioxide collected over water at 30.° C and 749 mm Hg. (The vapor pressure of water at 30.° C is 31.8 mmHg.)