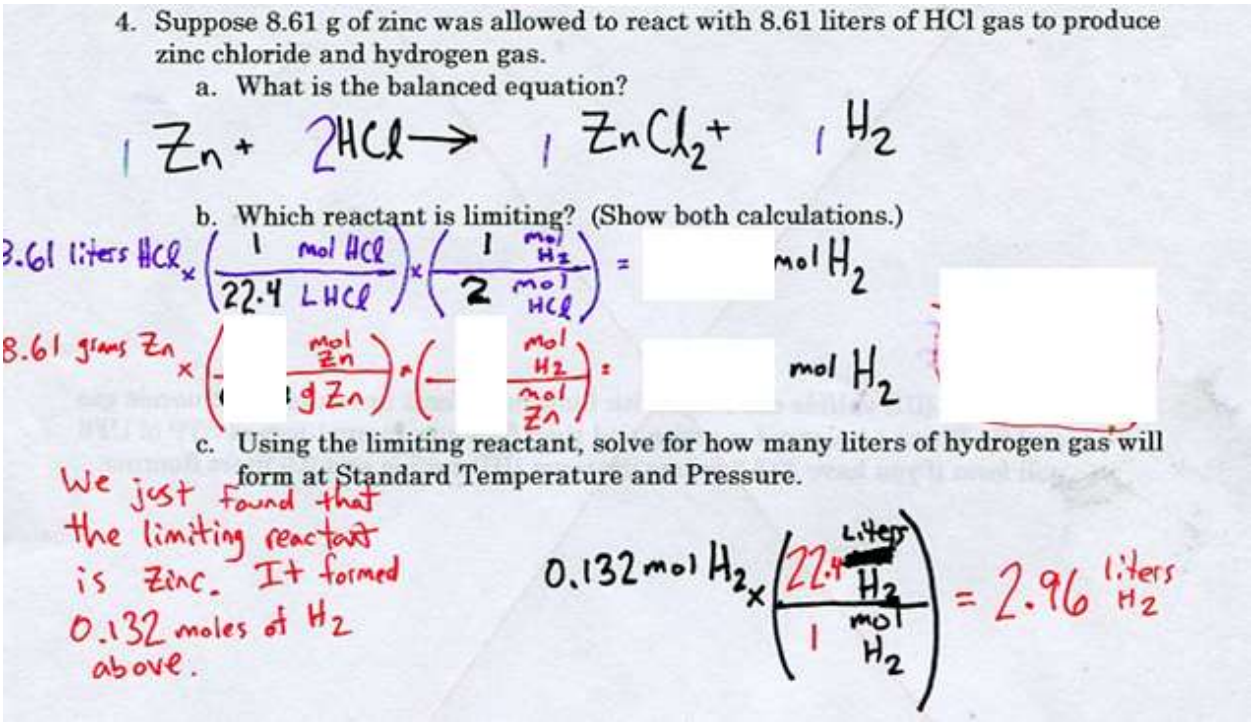
Clues and partial solutions for solving The Scissors Sheet homework tonight



4. Suppose 8.61 g of zinc was allowed to react with 8.61 liters of HCl gas to produce zinc chloride and hydrogen gas.

a. What is the balanced equation?

$1\ Zn + 2HCl \rightarrow 1\ ZnCl_2 + 1\ H_2$

b. Which reactant is limiting? (Show both calculations.)

8.61 liters $HCl \times \left(\frac{1\ mol\ HCl}{22.4\ L\ HCl}\right) \times \left(\frac{1\ mol\ H_2}{2\ mol\ HCl}\right) =$ [ ] mol H_2

8.61 grams $Zn \times \left(\frac{\text{[ ] mol Zn}}{\text{[ ] g Zn}}\right) \times \left(\frac{\text{[ ] mol } H_2}{\text{[ ] mol Zn}}\right) =$ [ ] mol H_2

c. Using the limiting reactant, solve for how many liters of hydrogen gas will form at Standard Temperature and Pressure.

We just found that the limiting reactant is zinc. It formed 0.132 moles of H_2 above.

$0.132\ mol\ H_2 \times \left(\frac{22.4\ L\ H_2}{1\ mol\ H_2}\right) = 2.96\ liters\ H_2$

fsadf

KEY

6. Suppose 2.00 L of nitrogen gas and 5.00 L of hydrogen gas are mixed and reacted to form ammonia (NH_3). Calculate the volume in liters of ammonia produced when this reaction runs to completion.

Step 1: balanced equation:

$1\,N_2 + 3\,H_2 \rightarrow 2\,NH_3$

use 22.4 x one — use the balanced eqn — use 22.4 and 1

Step 2:

$$2.00\ \text{L}\ N_2 \times \left(\frac{\text{mol}\ N_2}{\text{L}\ N_2}\right) \times \left(\frac{\text{mol}\ NH_3}{\text{mol}\ N_2}\right) \left(\frac{\text{L}\ NH_3}{\text{mol}\ NH_3}\right) =$$

$$5.00\ \text{L}\ H_2 \times \left(\frac{\text{mol}\ H_2}{\text{liters}\ H_2}\right) \times \left(\frac{\text{mol}\ NH_3}{\text{mol}\ H_2}\right) \left(\frac{\text{L}\ NH_3}{\text{mol}\ NH_3}\right) =$$

Answer

therefore multiple ways to solve. Since the answer is supposed to be in liters of NH_3 gas, we can save time by putting that as the goal in step 2.

Step 3. We sort of already combined step 3 into step 2. That's why we went into liters instead of stopping at moles.

7. Uranium (III) sulfide can react with fluorine to form uranium hexafluoride gas and S_8. Write a balanced reaction and then find how many liters at STP of UF6 will form if you have 333.3 grams uranium (III) sulfide and 0.9 liters fluorine.

Step 1

$$\_\,U_2S_3 + \_\,F_2 \rightarrow \_\,UF_6 + \_\,S_8$$

balance this!

use the periodic table

Step 2 + 3

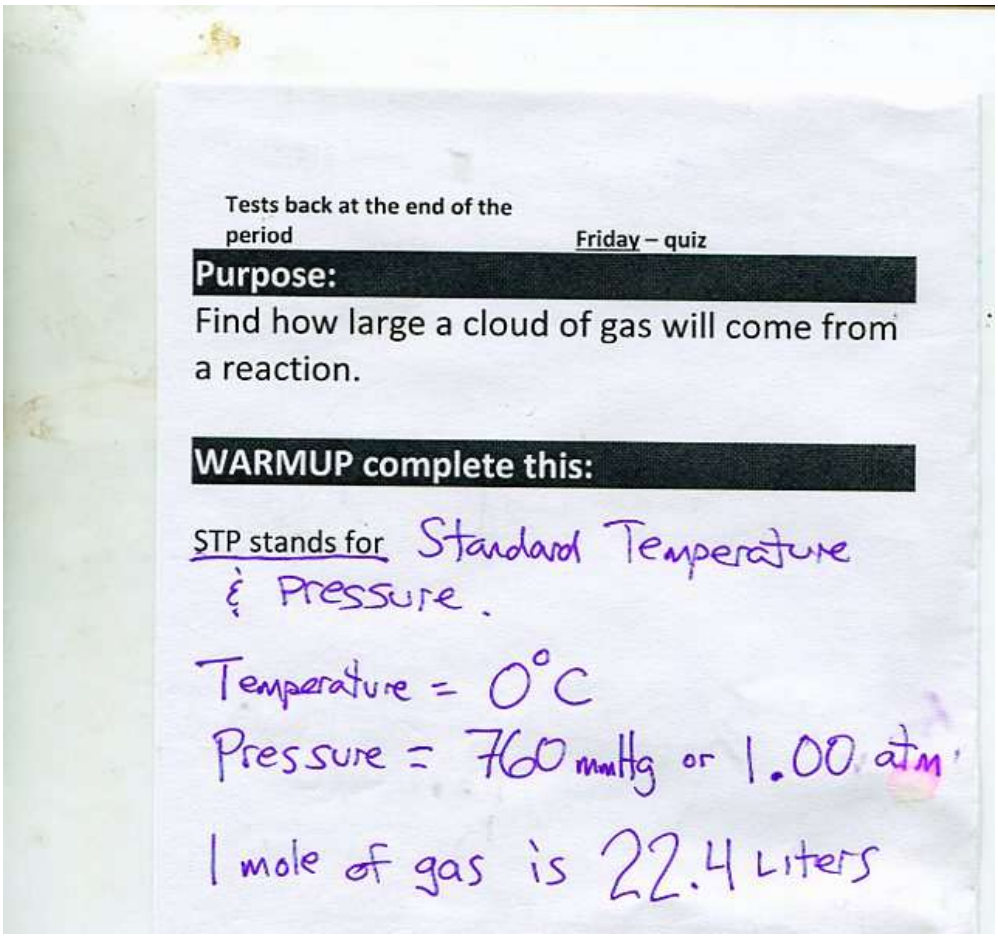
$$333.3\ \text{grams}\ U_2S_3 \times \left(\frac{\text{moles}\ U_2S_3}{\text{grams}\ U_2S_3}\right) \times \left(\frac{\text{moles}\ UF_6}{\text{moles}\ U_2S_3}\right) \times \left(\frac{\text{liters}\ UF_6}{\text{moles}\ UF_6}\right) =$$

$$0.9\ \text{liters}\ F_2 \times \left(\frac{\text{moles}\ F_2}{\text{liters}\ F_2}\right) \times \left(\frac{\text{moles}\ UF_6}{\text{moles}\ F_2}\right) \times \left(\frac{\text{liters}\ UF_6}{\text{moles}\ UF_6}\right) =$$

use: one mole = 22.4 L

use the coefficients from the balanced equation

Class Notes from today



Tests back at the end of the period

Friday – quiz

Purpose:

Find how large a cloud of gas will come from a reaction.

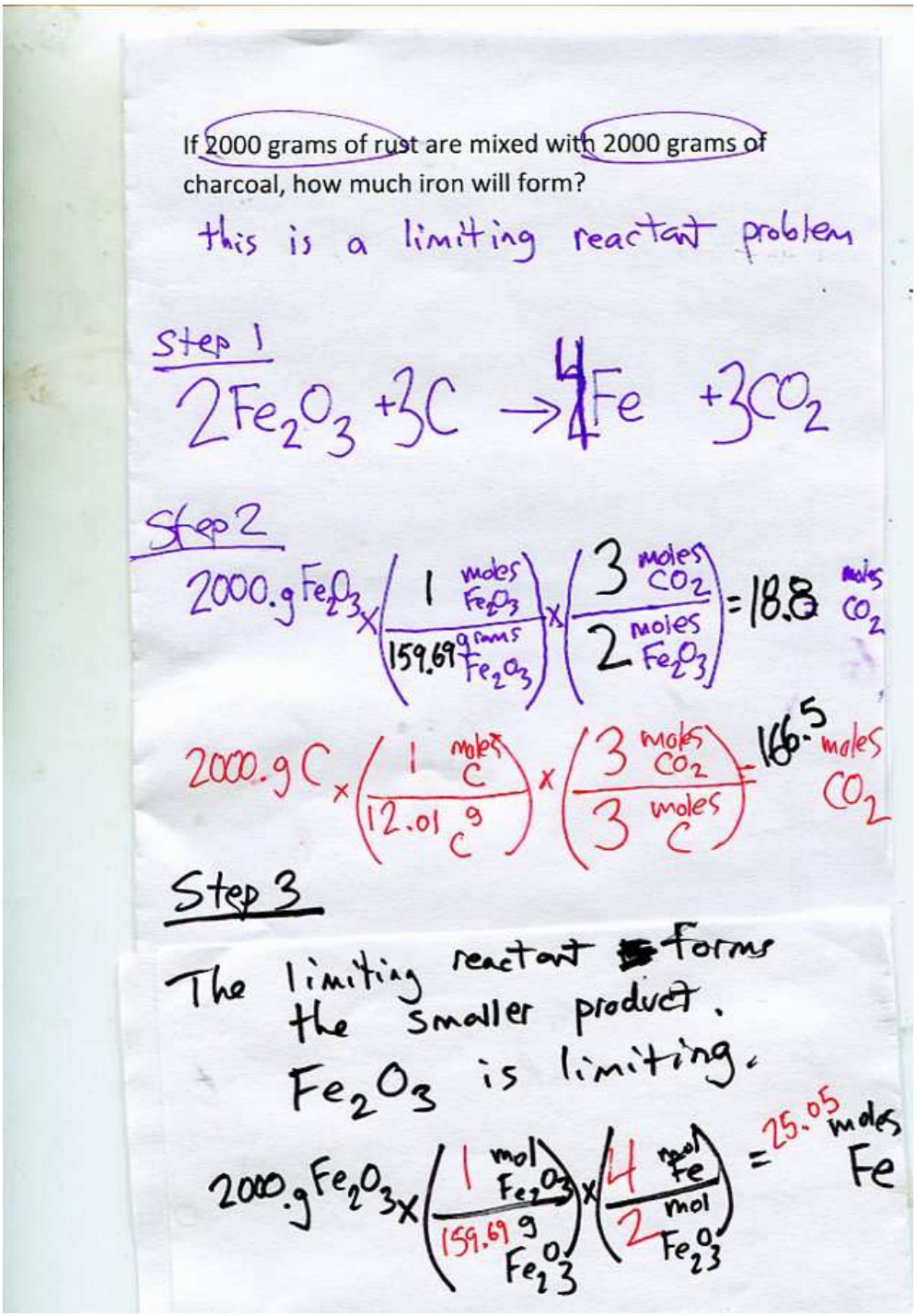
WARMUP complete this:

STP stands for Standard Temperature & Pressure.

Temperature = 0°C

Pressure = 760 mmHg or 1.00 atm

1 mole of gas is 22.4 Liters



Answer: 25.05 moles of Fe will form. (The question was a bit vague on what units to put the answer in. Grams would also make sense but moles was easiest to calculate.