CHEMISTRY 101 **SPRING 2005** NAME

EXAM 1 S 501-511 Signature

Form A

PART 2

Please read and sign: "On my honor, as an Aggie, I have neither given nor received unauthorized aid on this exam."

25. A scientist has two containers of sulfur and knows that she has Avogadro's number of sulfur **atoms** in each one. One container has only S_2 molecules in it and the other has only S_6 molecules in it. Answer the following questions and show your work to get full credit.

(10)

(4 pts) (a) Are the number of molecules the same in each container? Explain.

6.022×10^{23}

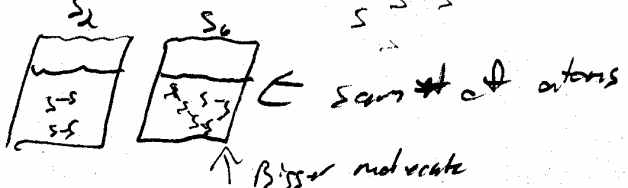
no; the ~~#~~ of atoms are the same but because S_2 has 2 atoms per molecule and S_6 has 6, ~~S_2 has~~ The container with S_2 has more molecules.

(6 pts) (b) Calculate the number of moles of sulfur molecules in each sample. Are the numbers the same? Draw a picture to defend your results.

in the container with S_2 there is $\frac{1}{2}$ of a mole of molecules

in the container with S_6 there is $\frac{1}{6}$ of a mole of molecules

the #s are not the same



OVER ⇒

(5 pts) **26.** Consider the following reaction: $K + H_2O \rightarrow KOH + H_2$ **UNBALANCED**

Balance the equation and describe what is happening as the reaction proceeds using the terms: atom, formula unit, and molecule.

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$2K + 2H_2O \rightarrow 2KOH + 2H_2$

2 potassium atoms react with 2 water molecules to form 2 potasium hydroxide formula units and 2 Hydrogen molecules.

(10 pts) **27.** Give the appropriate name or formula for a compound:

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(a) ammonium sulfate $(NH_4)_2SO_4$ -1

(b) iron(II) fluoride FeF_2 -1

(c) magnesium nitrate $Mg(NO_3)_2$ -1

(d) $Cu(CH_3COO)_2$ copper II acetate -1

(e) KOH Potasium hydroxide ✓

28. Water is formed by the direct reaction of hydrogen gas and oxygen gas, according to the reaction:

$H_2(g) + O_2(g) \rightarrow H_2O(g)$ **UNBALANCED**

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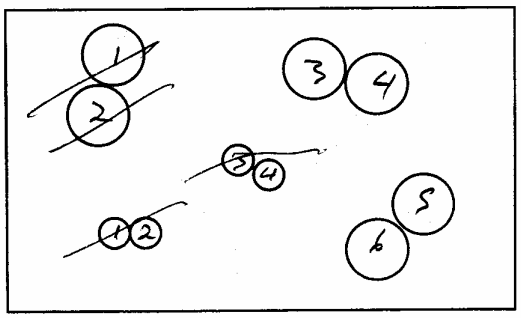
(2 pts) (a) Balance the equation.

$2H_2 + O_2 \rightarrow 2H_2O$

(5 pts) (b) Suppose you start the reaction with 3.0 moles of O_2 and 2.0 moles of H_2.
How many moles of H_2O can you make? 2 moles
What reactant is left over? How much of it is in excess?

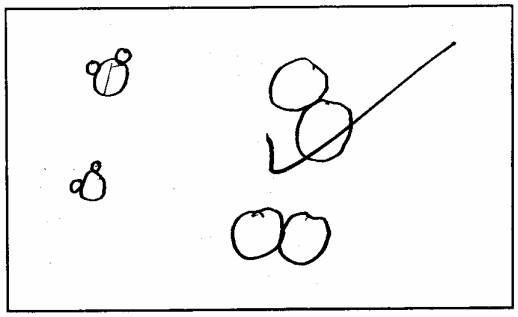
O_2 2 moles

(4 pts) (c) The initial system before the reaction began is represented by the following particle view:



where (H) is a hydrogen atom
(O) is an oxygen atom
is a water molecule

Draw a picture of the system after the reaction has gone to completion.



(4 pts) (d) Briefly explain this reaction and your picture using the concept of limiting reactant.

The reaction went until it ran out of Hydrogen because hydrogen was no longer around but still need for the reaction, it is considered the limiting reactant.

36/ good