Name _____ Period _____ Date _____

Chapter 9: Review Worksheet

1. Consider the reaction represented by the (unbalanced) equation

   $$N_2(g) + H_2(g) \rightarrow NH_3(g)$$

   determine the number of moles of NH3(g) that can be produced from the following:
   a. 0.20 mol $N_2(g)$ reacts completely with $H_2(g)$.
   b. 0.30 mol $H_2(g)$ reacts completely with $N_2(g)$.

2. Consider the reaction represented by the (unbalanced) equation

   $$Mg(s) + HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$$

   determine the mass of $H_2(g)$ that can be produced from the following:
   a. 10.0 g Mg(s) reacts completely with HCl(aq).
   b. 20.0 g HCl (aq) reacts completely with Mg(s).

3. What do we mean by the theoretical yield for a reaction? What is meant by the actual yield?

4. Consider the unbalanced equation for the combustion of ethyl alcohol, C_2H_5OH:

   $$C_2H_5OH\ (l) + O_2(g) \rightarrow CO_2(g) + H_2O(g)$$

   For a given amount of ethyl alcohol, write the mole ratios that would enable you to calculate the number of moles of each product, as well as the number of moles of O_2 that would be required. Show how these mole ratios would be applied if 0.65 mol of ethyl alcohol is combusted.

5. In the practice of chemistry one of the most important calculations concerns the masses of products expected when particular masses of reactants are used in an experiment. For example, chemists judge the practicality and efficiency of a reaction by seeing how close the amount of product actually obtained is to the expected amount. Using a balanced chemical equation and an amount of starting material of your choice, summarize and illustrate the various steps needed is such a calculation for the expected amount of product.

Chapter 9 Standardized Test Practice

1. Which of the following is not conserved in a chemical reaction?

A. Mass **B.** Atoms **C.** Moles **D.** Mass and atoms

2. The calculated amount of product that should be produced based on the amounts of reactants is known as the:

F. actual yield. **G.** percent yield. **H.** theoretical yield. **J.** minimum yield.

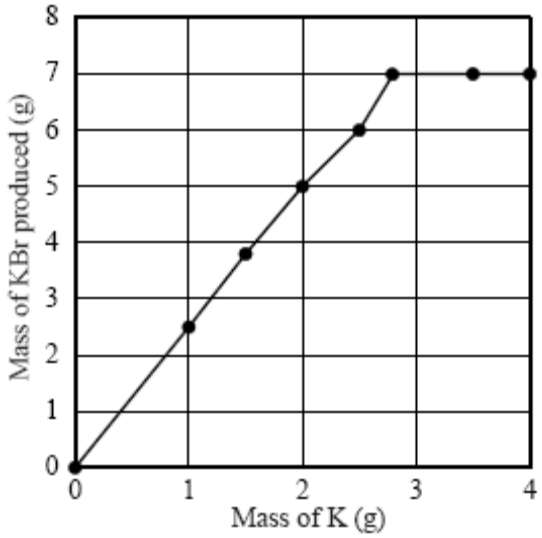
3. The mole ratio of two components in a chemical reaction is determined from the:

F. coefficients of each component. **H.** volume of each component.
G. mass of each component. **J.** number of atoms of each component.

Passage I

Use the following passage and graph to answer questions 4–6.

A student performs a laboratory experiment in which potassium bromide (KBr) was produced from a reaction involving solid potassium and liquid bromine. The graph below shows the amount of potassium bromide produced for varying amounts of potassium supplied for the reaction.



4. Which substance is the limiting reactant?

A. Solid potassium **B.** Liquid bromine **C.** Potassium bromide **D.** Oxygen

5. Based on the graph, estimate the amount of bromine used at the point where the addition of potassium has no effect on the amount of potassium bromide produced.

F. 1.2 g **G.** 2.8 g **H.** 4.2 g **J.** 7.0 g

13. How many moles of $N_2(g)$ molecules would contain exactly 4.0 moles of nitrogen atoms?

A. 1.0 mole **B.** 2.0 moles **C.** 3.0 moles **D.** 4.0 moles

15. If 3.00 moles of ZnS are combined with 4.00 moles of O_2, how many moles of ZnO can be produced?

A. 2.00 moles **B.** 2.67 moles **C.** 3.00 moles **D.** 5.67 moles

17. Given the balanced equation $2Al(s) + 3CuSO_4(aq) \rightarrow Al_2(SO_4)_3(aq) + 3Cu(s)$, which of the following is a correct interpretation of the equation?

A. 2 grams Al and 3 grams $CuSO_4$ react to form 1 gram $Al_2(SO_4)_3$ and 3 grams Cu.
B. 2 atoms Al and 3 formula units $CuSO_4$ react to form 1 formula unit $Al_2(SO_4)_3$ and 3 atoms Cu.
C. 2 moles Al and 3 moles $CuSO_4$ react to form 1 mole $Al_2(SO_4)_3$ and 3 moles Cu.
D. Both B and C are correct.