Name: _____

Unit 4 Practice Sheet (Chapter 10, 11, and 12)

***Chapter 10:**

1. What is the molar mass of the following substances?
   a. iron (III) acetate b. aluminum nitrate
2. Make the following conversions:
   a. Convert 97.3g lithium oxide to moles.
   b. Convert 12.7 mol of silicon dioxide to molecules.
   c. Convert 87.6L of nitrogen to moles at STP.
3. What is the percent composition of the following compounds?
   a. A sample is found to contain 40.7g of carbon, 12.3g of hydrogen, and 16.9g of oxygen.
   b. $MgSO_4$
4. What is the empirical formula for the following? (This is not a problem, just reduce the subscripts if possible)
   a. $C_{12}H_{22}O_{11}$
   b. H_2O_2
   c. P_4O_{10}
5. Calculate the empirical formula for the following compounds:
   a. 75% C and 25% H
   b. 40.92% C, 4.58% H, and 54.50% O
6. Calculate the molecular formula for a compound with an empirical formula of CH_2 and a molar mass of 70 g/mol.

***Chapter 11:**

Balance the following equations.

7. ___ PbO_2 → ___ PbO + ___ O_2
8. ___ $Fe(OH)_3$ → ___ Fe_2O_3 + ___ H_2O
9. ___ $(NH_4)_2CO_3$ → ___ NH_3 + ___ H_2O + ___ CO_2
10. ___ NaCl + ___ H_2SO_4 → ___ Na_2SO_4 + ___ HCl
11. ___ C_6H_6 + ___ O_2 → ___ CO_2 + ___ H_2O
12. ___ Ca_3P_2 + ___ H_2O → ___ $Ca(OH)_2$ + ___ PH_3
13. ___ $SrBr_2$ + ___ $(NH_4)_2CO_3$ → ___ $SrCO_3$ + ___ NH_4Br

Write the type of each reaction and predict the products. Be sure to balance the equation. (Hint: Zinc has a +2 charge.)

14. ___ Zn + ___ $AgNO_3$ →

15. ___ Mg + ___ O_2 →
16. ___ C_2H_6 + ___ O_2 →
17. ___ $H_2C_2O_4$ + ___ KOH →
18. ___ Ag_2O →

***Chapter 12:**

19. What is conserved in a chemical reaction? (List 2)
20. What unit should you think of when using coefficients?
21. How many moles of oxygen are needed to make 14.7 moles of water?

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$

22. How many moles of carbon dioxide are produced from 20.3 moles of C_2H_4?

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$

23. What are the 3 steps to a stoichiometry problem?
24. What are the 3 conversion factors for a mole?
25. How many grams of iodine are produced from 68.7L of carbon monoxide?

$I_2O_5 + 5CO \rightarrow 5CO_2 + I_2$

26. How many molecules of I_2O_5 are required to produce 3.41 mol of carbon dioxide?

$I_2O_5 + 5CO \rightarrow 5CO_2 + I_2$

27. If you start with 50g of copper (II) chloride and 50g of sodium nitrate, then how many moles of copper (II) nitrate will be produced? Identify the limiting and excess reagents.

$CuCl_2 + 2NaNO_3 \rightarrow Cu(NO_3)_2 + 2NaCl$

28. A student reacts 1.3 mol of silver with 3.7 mol of sulfur, how many moles of silver (I) sulfide will be produced? Identify the limiting and excess reagents.

$2Ag + S \rightarrow Ag_2S$

29. When 50g of chlorine reacts with potassium, 1.15 mol of potassium chloride is produced. What is the percent yield of the reaction?

$2K + Cl_2 \rightarrow 2KCl$

30. When 275g of sodium chlorate decomposes, 80.11L of oxygen is produced. What is the percent yield of the reaction?

$2NaClO_3 \rightarrow 2NaCl + 3O_2$