Chem 111 Review Sheet #3

1. How many grams of hydrogen gas are produced by the action of water on 100. Grams of sodium metal? (4.39 g)
2. What is the molarity of a solution which contains 0.040 moles of sodium hydroxide in 160 mL of solution? (0.25M)
3. How many grams of sodium hydroxide are contained in 1.00 L of 0.25 M solution of sodium hydroxide? (10.0 g)
4. What is the molarity of a solution of sodium chloride which contains 17.4 g of sodium chloride in 250. mL of solution? (1.19 M)
5. Calculate the molar mass of potassium ferricyanide, $K_3Fe(CN)_6$. (329.27 g/mol)
6. How many grams of $BaSO_4$ may be precipitated from a solution containing 0/.314 g of sodium sulfate in solution mixed with an excess of aqueous barium chloride? (0.516 g)
7. What volume of 7.60 M hydrochloric acid solution is needed to prepare 4.50 L of 2.30 M solution of hydrochloric acid? (1.36 L)
8. Determine the pH of a solution whose hydrogen ion concentration is 0.0001 moles/L. (pH=4.0)
9. What is the hydrogen ion concentration of a solution which has a pH = 5.0? (10^{-5}M)
10. Metals react with most nonmetals to form compounds called _____.
11. The number of protons in an atom is equal to the _____ of that element.
12. The nucleus is made up of _____ and _____.
13. The fact that carbon dioxide is not polar indicates that the molecule is _____.
14. Chemical bonds which involve the sharing of electron pairs are called _____ and _____ bonds.
15. Which bond has the least ionic character?
    a. H-Cl b. P-Cl c. Br-Cl d. O-Cl
16. Describe the bonds and the shapes of the following molecules:
    a. Fluorine
    b. Ammonia
    c. Water
    d. Hydrogen chloride
17. The attraction of polar molecules for each other is primarily due to _____forces.
18. The attraction between non-polar molecules is primarily due to _____ forces.
19. Chemical reactions may be classified under five main types. List them.
20. For each pair of reactants, classify the reaction type, complete the chemical equation and balance it.
    a. $Ni(s) + S_8(s) \rightarrow$
    b. $C_6H_6(l) + O_2(g) \rightarrow$
    c. $K(s) + H_2O(l) \rightarrow$
    d. $AlCl_3(aq) + NaOH(aq) \rightarrow$
21. List the number of subatomic particles in each of the following isotopes;
    a. Calcium-42 b. strontium-90
22. What empirical and theoretical characteristics of the noble gas family has made this family especially interesting to chemists?
23. Write the chemical name and symbol that corresponds to each of the following theoretical descriptions?
    a. 11 protons and 10 electrons
    b. 18 electrons and a net charge of 3-
    c. 16 protons and 2 extra electrons
24. Describe solids, liquids and gases in terms of theoretical types of molecular motion.
25. List the three parts to the collision reaction theory.
26. List all of the entities (atoms, ions and /or molecules) believed to be present when each of the following is present in water.
    a. Calcium chloride
    b. Ethanol
    c. Ammonium carbonate
    d. Copper
    e. Lead(II) hydroxide
    f. Hydrogen sulfate
    g. Aluminum sulfate
    h. Sulfur
27. Draw the electron dot diagram and the structural diagram for each molecule in the following reactions.
    a. $N_2(g) + I_2(s) \rightarrow NI_3(s)$
    b. $H_2O_2(l) \rightarrow H_2O(l) + O_2(g)$