Chemistry 121
Spring 2004
Test 2
FORM A

Name: _____

Instructions: You have 75 minutes to complete this 100-point exam. You may use a simple scientific calculator. No programmable calculators allowed.

$$^0F = \left(\frac{9°F}{5°C}\right)(°C) + 32°F \qquad\qquad ^0C = \left(\frac{5°C}{9°F}\right)\left(^0F - 32^0F\right)$$

1 in = 2.54 cm   1000g = 1kg

1000 mg = 1 g

I. MULTIPLE CHOICE: (30 pts, 3 points each) Carefully and clearly circle the best answer. If you circle two answers, *one of which is correct*, you will receive 1 point.

1. The correct chemical formula for sodium phosphate is:
    a. SPO_4
    b. S_3PO_4
    c. $NaPO_4$
    d. Na_3PO_4

2. Which of these is NOT soluble in water?
    a. $NaCl$
    b. $AgCl$
    c. $BaCl_2$
    d. KCl

3. In a balanced reaction, _____ are balanced.
    a. molecules
    b. moles
    c. atoms
    d. protons

4. Which of the following is the net ionic reaction of $Fe(NO_3)_3$ with $NaOH$?
    a. $Fe(NO_3)_3 + 3\ NaOH \rightarrow Fe(OH)_3\ (s) + 3\ NaNO_3$
    b. $Fe(NO_3)_3 + 3\ Na^+ + 3\ OH^- \rightarrow Fe(OH)_3\ (s) + 3\ Na^+ + 3\ NO_3^-$
    c. $Fe^{3+} + 3\ NO_3 + 3\ NaOH \rightarrow Fe(OH)_3\ (s) + 3\ NaNO_3$
    d. $Fe^{3+} + 3\ OH^- \rightarrow Fe(OH)_3\ (s)$

5. Which of the following will totally dissociate in water?
    a. $Fe(OH)_3$
    b. $LiOH$
    c. $Cu(OH)_2$
    d. $Zn(OH)_2$

6. The point in a titration where the acid is exactly neutralized is called the:
   a. Neutral Point
   b. Indicator Point
   c. Standard Point
   d. End Point

7. Sodium chloride (NaCl) is a(n):
   a. Electrolyte
   b. Nonelectrolye
   c. Acid
   d. Base

8. What are the products of a combustion reaction?
   a. C, H and O
   b. C, H, O and N
   c. CO and H_2O
   d. CO_2 and H_2O

9. What are the correct stoichiometric coefficients to balance the following equation?
   a. 2, 1, 1, 1, 2
   b. 1, 1, 1, 1, 1 $HNO_3 + Na_2CO_3 \rightarrow H_2 + CO_2 + NaNO_3$
   c. 2, 1, 1, 1, 1
   d. 2, 2, 2, 1, 1

10. Which ion (if any) will react with sulfate ion to form a precipitate?
    a. Na^+
   b. K^+
    c. Ca^{2+}
    d. None of these

II. Short Answer and Calculations (80 pts): Clearly indicate your answer in the space provided. Partial credit will be given for correct work. If I cannot read the work, it will not be graded.

1. (15 pts) Write the complete, total ionic and net ionic equations for the reaction of aqueous potassium iodide with aqueous silver (I) nitrate.
   a. Complete

   b. Total Ionic

   c. Net Ionic

2. (5 pts) Write the balanced reaction for the combustion of C_6H_{14}.

3. (10 pts) If 5.75 g of lithium carbonate is dissolved in enough water to make 0.500 L of solution, what is the molarity of lithium carbonate? (MM of Li_2CO_3 = 73.893 g/mol)

4. (10 pts) How many milliliters of 5.0 M NaOH are required to make 100.00 mL of 0.200 M NaOH?

5. (15 pts) If 1.50 L of 0.125 M HCl is exactly neutralized by 3.00 L of $Ba(OH)_2$, what is the molarity of the base?

$$2\ HCl + Ba(OH)_2 \rightarrow 2\ H_2O + BaCl_2$$
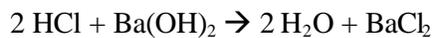
6. (15 pts) Diammonium Phosphate (DAP) is a common component of fertilizer. $(NH_4)_2HPO_4$ is manufactured by the reaction of ammonia and phosphoric acid. How many grams of $(NH_4)_2HPO_4$ can be formed from 0.125 L of 0.25 M H_3PO_4 and 0.150 L of 0.15 M NH_3. (MM of $(NH_4)_2HPO_4$ 132.055 g/mol)

$$H_3PO_4 + 2\ NH_3 \rightarrow (NH_4)_2HPO_4$$
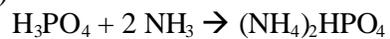
7. (10 pts) What is the percent yield of a reaction that has an actual yield of 1.25 g and a theoretical yield of 8.75 g?