

Name: \_\_\_\_\_

**Chemistry 121**  
**Fall 2003**  
**Exam 2**  
**75 minutes/100 pts**

**FORM A**

Instructions: You have 75 minutes to complete this 100-point exam. Indicate your exam form on the line marked "SUBJECT" on the scantron. NO CALCULATORS OF ANY KIND ALLOWED.

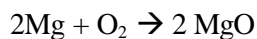
**I. MULTIPLE CHOICE:** (80 pts, 4 points each) Indicate the best answers on the scantron using a #2 pencil.

- When the following equation is balanced, what is the number that appears before the symbol  $\text{Sn}^{2+}$ ?
  - 2
  - 3
  - 4
  - 5
$$? \text{Sn}^{2+} + ? \text{PO}_4^{3-} \rightarrow \text{Sn}_7(\text{PO}_4)_7$$
- The ions present in solid silver chromate,  $\text{Ag}_2\text{CrO}_4$ , are
  - $\text{Ag}^+$  and  $\text{CrO}_4^{2-}$
  - $\text{Ag}^+$ ,  $\text{Cr}^{6+}$  and  $\text{O}^{2-}$
  - $\text{Ag}^{2+}$  and  $\text{CrO}_4^{4-}$
  - $\text{Ag}^+$ ,  $\text{Cr}^{3+}$  and  $\text{O}^{2-}$
- How many moles of Fe are needed to produce 10.0 mol of  $\text{H}_2$ ?
  - 7.50 mol
  - 13.3 mol
  - 13.0 mol
  - 15.0 mol
$$4 \text{H}_2\text{O} + 3\text{Fe} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$$
- What volume 0.550 M  $\text{MgCl}_2$  contains 1.1 moles of  $\text{MgCl}_2$ ?
  - 0.605 L
  - 2.00 L
  - 0.500 L
  - 1.65 L
- How many milliliters of 10.0 M HCl are required to make 100.00 mL of 0.200 M HCl?
  - 1.00 mL
  - 10.0 mL
  - $5.00 \times 10^3$  mL
  - 2.00 mL
- The balanced equation for the complete combustion of cyclohexane is:
  - $\text{C}_6\text{H}_{12} + 18 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$
  - $\text{C}_6\text{H}_{12} + 9 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$
  - $\text{C}_6\text{H}_{12} + 6 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$
  - $2 \text{C}_6\text{H}_{12} + 18 \text{O}_2 \rightarrow 12 \text{CO}_2 + 6 \text{H}_2\text{O}$

7. In a balanced chemical equation, what is balanced?
- Atoms
  - Moles
  - Molecules
  - Atoms and molecules
8. When the equation below is properly balanced, the respective coefficients are:
- $\underline{\hspace{1cm}} \text{NH}_3 + \underline{\hspace{1cm}} \text{F}_2 \rightarrow \underline{\hspace{1cm}} \text{N}_2\text{F}_4 + \underline{\hspace{1cm}} \text{HF}$
- 2, 1, 1, 6
  - 2, 3, 1, 6
  - 2, 5, 1, 6
  - 2, 10, 1, 6
9. What is the actual yield of a reaction that has a percent yield of 78.6% and a theoretical yield of 52.3 g?
- 66.5 g
  - 41.1 g
  - $1.50 \times 10^3$  g
  - 26.3 g
10. Which of the following is a strong base?
- $\text{Fe}(\text{OH})_3$
  - $\text{Zn}(\text{OH})_2$
  - $\text{Sr}(\text{OH})_2$
  - $\text{Al}(\text{OH})_3$
11. Which of the following is predicted to be insoluble in water?
- NaBr
  - $\text{K}_2\text{SO}_4$
  - FeS
  - $(\text{NH}_4)_2\text{S}$
12. Which of these acids will dissociate 100%?
- $\text{C}_6\text{H}_5\text{CO}_2\text{H}$
  - $\text{H}_3\text{SO}_3$
  - $\text{CH}_3\text{CO}_2\text{H}$
  - HF
13. The correct chemical formula of potassium sulfide is:
- KS
  - $\text{K}_2\text{S}$
  - $\text{KSO}_4$
  - $\text{K}_2\text{SO}_4$
14. A solution that conducts electricity is called a (n)
- Electrolyte.
  - Nonelectrolyte.
  - Precipitate.
  - Coefficient.

15. Given the following balanced reaction, which reactant is limiting if you have 4.0 mol Mg and 4.0 mol O<sub>2</sub>?

- a. Mg
- b. O<sub>2</sub>
- c. MgO
- d. None



16. The reaction of silver nitrate and magnesium chloride produces \_\_\_\_\_ as a precipitate.

- a. Mg(NO<sub>3</sub>)<sub>2</sub>
- b. MgCl<sub>2</sub>
- c. AgCl
- d. AgNO<sub>3</sub>

17. All the following compounds are soluble in water except for:

- a. Na<sub>3</sub>PO<sub>4</sub>
- b. Fe(ClO<sub>4</sub>)<sub>2</sub>
- c. MnCl<sub>2</sub>
- d. CaSO<sub>4</sub>

18. In an acid-base titration, the point at which the moles of base added equal the moles of acid is called the:

- a. Indicator point.
- b. End point.
- c. Buret point.
- d. Acid point.

19. The net ionic equation for the neutralization of nitric acid with iron (II) hydroxide is:

- a.  $2\text{HNO}_3 + \text{Fe}(\text{OH})_2 \rightarrow 2\text{H}_2\text{O} + \text{Fe}(\text{NO}_3)_2$
- b.  $\text{HNO}_3 + \text{OH}^- \rightarrow \text{H}_2\text{O} + \text{NO}_3^-$
- c.  $2\text{H}^+ + \text{Fe}(\text{OH})_2 \rightarrow 2\text{H}_2\text{O} + \text{Fe}^{2+}$
- d.  $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$

20. Acetic acid (CH<sub>3</sub>CO<sub>2</sub>H) is a(n):

- a. Strong acid.
- b. Weak acid.
- c. Nonelectrolyte.
- d. Common indicator.

**II. Balancing and Calculations** (30 pts, 10 pts each): 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.

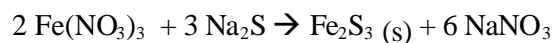
1. Write the complete, total ionic and net ionic equation for the reaction of sodium sulfate with barium chloride.

Complete: \_\_\_\_\_

Total Ionic: \_\_\_\_\_

Net Ionic: \_\_\_\_\_

2. What mass of iron (III) sulfide is produced from the reaction of 11.6g of iron(III) nitrate with 0.0500 L of 0.875 M sodium sulfide? (MM of  $\text{Fe}(\text{NO}_3)_3 = 241.88 \text{ g/mol}$ , MM of  $\text{Fe}_2\text{S}_3 = 207.88 \text{ g/mol}$ )



3. If 10.0 L of 6.0 M NaOH neutralizes 15.0 L of carbonic acid, what is the molarity of the acid?

