

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.

1. When the following equation is balanced, what is the number that appears before the symbol Sn^{2+} ?
 - a. 2
 - b. 3
 - c. 4
 - d. 5
$$? \text{Sn}^{2+} + ? \text{PO}_4^{3-} \rightarrow \text{Sn}_7(\text{PO}_4)_7$$

2. The ions present in solid silver chromate, Ag_2CrO_4 , are
 - a. Ag^+ and CrO_4^{2-}
 - b. Ag^+ , Cr^{6+} and O^{2-}
 - c. Ag^{2+} and CrO_4^{4-}
 - d. Ag^+ , Cr^{3+} and O^{2-}

3. How many moles of Fe are needed to produce 10.0 mol of H_2 ?
 - a. 7.50 mol
 - b. 13.3 mol
 - c. 13.0 mol
 - d. 15.0 mol
$$4 \text{H}_2\text{O} + 3\text{Fe} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$$

4. What volume 0.550 M MgCl_2 contains 1.1 moles of MgCl_2 ?
 - a. 0.605 L
 - b. 2.00 L
 - c. 0.500 L
 - d. 1.65 L

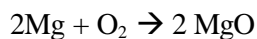
5. How many milliliters of 10.0 M HCl are required to make 100.00 mL of 0.200 M HCl?
 - a. 1.00 mL
 - b. 10.0 mL
 - c. 5.00×10^3 mL
 - d. 2.00 mL

6. The balanced equation for the complete combustion of cyclohexane is:
 - a. $\text{C}_6\text{H}_{12} + 18 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$
 - b. $\text{C}_6\text{H}_{12} + 9 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$
 - c. $\text{C}_6\text{H}_{12} + 6 \text{O}_2 \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$
 - d. $2 \text{C}_6\text{H}_{12} + 18 \text{O}_2 \rightarrow 12 \text{CO}_2 + 6 \text{H}_2\text{O}$

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:
- _____ NH_3 + _____ F_2 \rightarrow _____ N_2F_4 + _____ 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
 - 1.50×10^3 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
 - K_2SO_4
 - FeS
 - $(\text{NH}_4)_2\text{S}$
12. Which of these acids will dissociate 100%?
- $\text{C}_6\text{H}_5\text{CO}_2\text{H}$
 - H_3SO_3
 - $\text{CH}_3\text{CO}_2\text{H}$
 - HF
13. The correct chemical formula of potassium sulfide is:
- KS
 - K_2S
 - KSO_4
 - K_2SO_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 O₂?

- a. Mg
- b. O₂
- c. MgO
- d. None



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

- a. Mg(NO₃)₂
- b. MgCl₂
- c. AgCl
- d. AgNO₃

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

- a. Na₃PO₄
- b. Fe(ClO₄)₂
- c. MnCl₂
- d. CaSO₄

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 (CH₃CO₂H) 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.

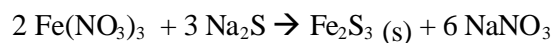
1. Write the complete, total ionic and net ionic equation for the reaction of sodium sulfate with barium chloride.

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?

