

**CHEM 1104 Exam 2. October 10, 2007**

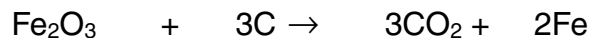
Name \_\_\_\_\_ **Note: You must show all work for credit.**

I certify that I have neither given nor received unauthorized aid on this assignment.

$$M = \frac{\text{moles}}{L}$$

Useful information: \_\_\_\_\_, LEO says GER

(1)(6 points) A flask containing 5.00 g of C and 14.1 g of Fe<sub>2</sub>O<sub>3</sub> were reacted according to the following equation.



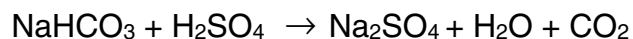
(a) Which reagent is the limiting reagent?

(b) How much Fe should form?

(c) If the amount of Al<sub>2</sub>O<sub>3</sub> formed was 3.62 g, what is the % yield?

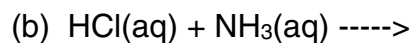
(2)(2 points) How would you make a 500.0 mL, 0.100 M solution of NaClO from a 7.80 M stock solution?

(3)(4 points) If it takes 22.1 mL of 0.98 M  $\text{H}_2\text{SO}_4$  to fully react with the  $\text{NaHCO}_3$  (according to the unbalanced reaction below) in a 15.00 mL sample of water. How much  $\text{NaHCO}_3$  was present (in grams)?

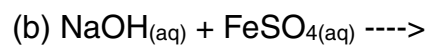
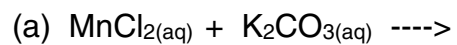


(4)(4 points) Aspirin is acetylsalicylic acid. It is derived from salicylic acid which is found in willow tree bark. The elemental composition of aspirin (in mass %) is 60.00% C, 4.49% H, and 35.52% O. What is the empirical formula for aspirin?

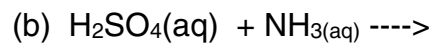
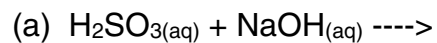
(5)(4 points) Write the net acid-base reactions for the following neutralizations



(6)(4 points) Write the balanced molecular, ionic and net ionic equations for the following reactions



(7)(4 points) Complete the following neutralization reactions and balance them for complete neutralization (all acidic protons neutralized, all basic units neutralized).



(8)(2 points) Label the following strong electrolytes, weak electrolytes, or nonelectrolytes

(a)  $\text{PCl}_3$

(b)  $\text{HF}$

(c)  $\text{NaOH}$

(d)  $\text{MgCl}_2$

(9)(2 points) Name the following compounds

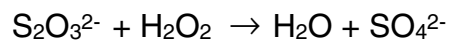
(a)  $\text{Mg}(\text{OH})_2$

(b)  $\text{HClO}$

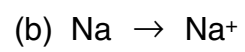
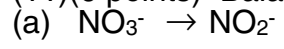
(c)  $\text{HCl}$

(d)  $\text{NH}_3$

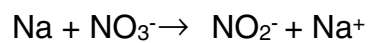
(10)(4 points) Break the following reaction into an oxidation and a reduction 1/2 reaction. Show all work and the oxidation states of the species being oxidized and reduced. You don't have to balance the 1/2 reactions.



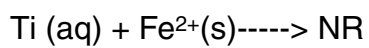
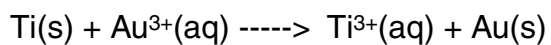
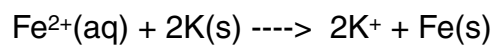
(11)(6 points) Balance the following half-reactions in base



(12)(4 points) Balance the following oxidation-reduction reaction in base



(13)(4 points) Construct an activity series based on the following experimental results



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(14)(4 points) Name a reagent that you could use to separate the  $\text{Ni}^{2+}$  and  $\text{Ag}^+$  from a solution of  $\text{Ni}(\text{NO}_3)_2$  and  $\text{AgNO}_3$  by a precipitation. Write out the precipitation reaction and list which metal will be in the precipitate and which will be left in solution.