

# Chemistry 1054 Exam 2, October 11, 2006

Name \_\_\_\_\_

By submitting this exam, I affirm that I have neither given nor received unauthorized aid. Remember, you must show work for credit.

Useful information:  $N_A$ , Avagadro's # =  $6.022 \times 10^{23}$  things/mole,  $M = \frac{\text{moles}}{L}$

(1)(4 points) Convert the masses of the following compounds into moles.

(a) 5.88 g of  $\text{Fe}(\text{NO}_3)_3$

(b) 2.56 g of LiBr

(2)(4 points) Fill in the following table

Formula	Name
$\text{HClO}_2$	
	sodium sulfite
$\text{NaNO}_2$	
	sulfur hexabromide

(3)(4 points) Classify the following as either element, compound, heterogeneous mixture, or homogeneous mixture.

(a) apple pie

(b) ammonia

(c) window

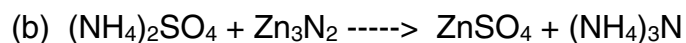
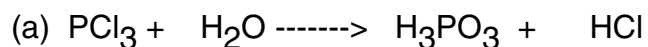
(d) sandpaper

(4)(4 points) Assume that chromium only consisted of two isomers in nature. If the following information represents the abundance and mass of the two isomers, what is the average atomic weight that should go on the periodic table (this will not be the actual mass on the periodic table).

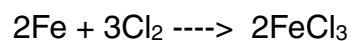
$^{50}_{24}\text{Cr}$  mass = 49.9461, abundance = 17.25%

$^{53}_{24}\text{Cr}$  mass = 52.9407, abundance = 82.75%

(5)(4 points) Balance the following equations



(6)(6 points) Iron (6.00 g) is reacted with chlorine (11.0 g) according to the reaction below.



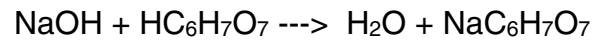
(a) Which reagent is the limiting reagent?

(b) How much  $\text{FeCl}_3$  should form?

(c) If the amount of  $\text{FeCl}_3$  that formed was 8.22 g, what is the % yield?

(7)(2 points) If 0.355 g of KCl is dissolved in a 500.0 mL solution, what is the molarity?

(8)(4 points) A can of citrus soda was titrated with 0.0100 M NaOH. If it took 12.54 mL of 0.0100 M NaOH to neutralize the acid in 25.00 mL of the citrus soda, what was the concentration of the acid in the can?



(9)(4 points) Vanillin ( $\text{C}_8\text{H}_8\text{O}_3$ ) is the molecule responsible for the familiar vanilla flavor . What is the elemental composition (in %) of vanillin ( $\text{C}_8\text{H}_8\text{O}_3$ )?

(10)(5 points) Police accuse a person of possession of a large amount of steroids (testosterone). The person states that it is only sugar. If the elemental analysis of the compound comes back as 84.5% C, 11.3%H, and 4.17%O, what is the formula of the compound? Are the police right?

Extra Credit:(3 points) If 20.0 g of  $\text{CH}_4$  and 69.0 g of  $\text{O}_2$  are mixed and burned, what compounds remain at the end of the reaction? Write each of the compounds with the amount of the compound present(in moles) when the reaction is complete.