

Be sure to show all work, use the correct number of significant figures, circle final answers and use correct units in all problems. This take-home quiz will be due at the time of your midterm exam. *No late assignments!*

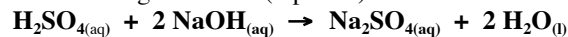
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1. Both **ethanol** (C<sub>2</sub>H<sub>6</sub>O) and **ammonium carbonate** ((NH<sub>4</sub>)<sub>2</sub>CO<sub>3</sub>) are water soluble compounds. (4 points)

- Write the dissociation products (if any) present when ethanol is dissolved in water. \_\_\_\_\_
- Write the dissociation products (if any) present when ammonium carbonate is dissolved in water. \_\_\_\_\_
- Which compound will have the highest electrical conductivity in water? \_\_\_\_\_
- State the oxidation number for each atom in ammonium carbonate.

2. Complete the following problems.

- Write the net ionic equation for the following reaction: (2 points)



- Write the spectator ion(s) in the reaction in #2a. (2 points)

3. Consider the equation:  $\text{Cu}_{(\text{s})} + 2 \text{AgNO}_{3(\text{aq})} \rightarrow 2 \text{Ag}_{(\text{s})} + \text{Cu}(\text{NO}_3)_{2(\text{aq})}$  (4 points)

- Write the oxidation number for each element, above.

- What is the oxidizing agent? \_\_\_\_\_

- What is the reducing agent? \_\_\_\_\_

4. Short answer (4 points)

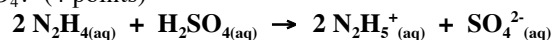
A species is a(n) \_\_\_\_\_ (oxidizing agent or reducing agent) when it gains electrons.

Water and \_\_\_\_\_ are the products in the combustion reaction of a hydrocarbon.

Bromous acid is a \_\_\_\_\_ (weak, strong or non-) electrolyte,

and lithium hydroxide is a \_\_\_\_\_. (weak base, strong base, weak acid, or strong acid.)

5. Hydrazine, N<sub>2</sub>H<sub>4</sub>, a base like ammonia, can react with an acid such as sulfuric acid as shown below. What mass of hydrazine reacts with 315 mL of 0.116 M H<sub>2</sub>SO<sub>4</sub>? (4 points)

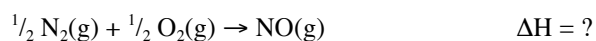


CH 221 Fall 2009 Quiz #5 Continued

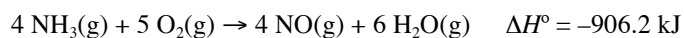
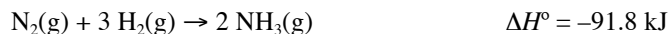
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1. What velocity must 9.7 kg of iron travel to have a kinetic energy of 19.0 J? (2 points) *Recall:*  $KE = \frac{1}{2} mv^2$
2. 300.0 J of energy are added to 30.0 grams of iron at an initial temperature of 35 °C, and 300.0 J of energy are added to 30.0 grams of liquid ethanol at an initial temperature of 35 °C. Which species will have the highest final temperature? Why? (4 points)
3. If 45.0 g of ice at -12.0 °C is added to 256 g of water at 31.4 °C, what is the final temperature of the resulting mixture? (6 points)  
*Helpful constants for water:* Heat of fusion: 333 J/g;  $C(\text{ice}) = 2.09 \text{ J/gK}$ ;  $C(\text{liquid water}) = 4.184 \text{ J/gK}$

4. Find the heat of formation for nitrogen monoxide using the following reaction



and given the following thermodynamic data: (6 points)



5. Write the equation for the standard enthalpy of formation of  $\text{N}_2\text{O}_3$ . (2 points)