Chem 1314 Section 2
InClass Exercise #4
Fall 2000

Name_____
TA Name _____
Lab Section #_____

ALL work must be shown to receive full credit. **Due at the end of laboratory.**

ICE4.1. Write the chemical formula(s) of the product(s) and balance the following reactions. Identify all products phases as either (g)as, (l)iquid, (s)olid or (aq)ueous.

a) $Cu(NO_3)_{2(aq)} + Mg_{(s)} \rightarrow$

b) $NH_{3(g)} + O_{2(g)} \rightarrow$

c) $NaOH_{(aq)} + HC_2H_3O_{2(aq)} \rightarrow$

d) $BaCl_{2(aq)} + Na_2CO_{3(aq)} \rightarrow$

ICE4.2. Write the ionic and net ionic chemical equations for a, c, and d.

a)

c)

d)

ICE4.3. A 3.00 g sample of a metal alloy is heated to 99.5 ˚C. It is then dropped into 28.0 g of water in a calorimeter. The water temperature rises from 22.45 ˚C to 23.95 ˚C. The heat capacity of the calorimeter is 13.5 J $˚C^{-1}$. Calculate the specific heat of the alloy.

ICE4.4. A 2.00 g sample of NH_4NO_3 is added to 35.0 gram of water in a coffee-cup calorimeter and stirred until it dissolves. The temperature of the solution drops from 24.55 ˚C to 22.47 ˚C. Calculate the ΔH° of solution for in NH_4NO_3 kJ mol^{-1}.

ICE4.5. Since we know that coffee-cup calorimeters usually absorb some heat in reactions use the data in ICE4.4 and calculate the temperature change in the calorimeter if its heat capacity is 15.6 $J^\circ C^{-1}$. (Hint: to sole this problem you must use the ΔH° of solution for in NH_4NO_3 that you calculated in ICE4.4. Assume the same mass of NH_4NO_3 and water.)

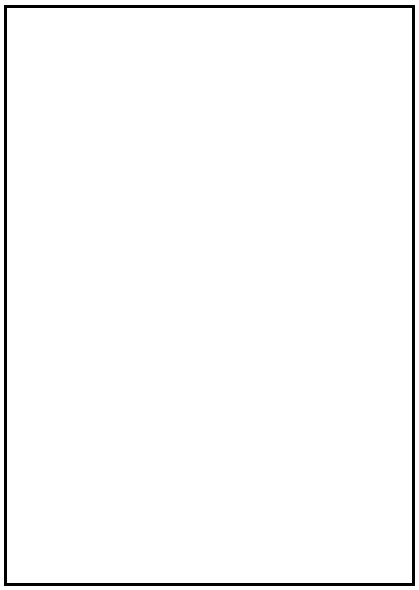
ICE4.6. A hydrogen atom emits a photon of light with a wavelength of 1.28×10^{-6} m.

a) Calculate the frequency of this photon.

b) Calculate the energy of the photon.

c) Determine the initial energy level of the electron if the final energy level the electron has is $n = 3$.

d) Draw and label an energy level diagram for the hydrogen atom and show the transition for the electron as determined in c.



ICE4.7. Write the electron configuration and indicate the number of unpaired electrons for each of the following in their ground state,

i. Mn ——— unpaired electrons

ii. S^{2-} ——— unpaired electrons

iii. Cm ——— unpaired electrons

ICE4.8. Draw the orbital diagram for the valence electrons for oxygen in its ground state