**Homework #7: Chemistry 1013 Spring 2015**

**Due Friday 10 April**

**\_\_\_\_\_/35**

**Your name:\_\_\_\_\_\_\_\_\_\_\_\_\_answers\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Show work for all problems or you will receive no credit/ 2 pts per problem**

1) Double Replacement (Precipitation) Reactions (11 pts)

a) Use the solubility rules from table 4.1 of your text (or the rules from the April 3 Power point) and decide what phase(s) [(aq) or (s)] the products of a metatheses (double replacment) reaction would be starting from the reactants below. Make sure your reactions are balanced ! (2 pts each/8 pts total)

Reactants Products (include phases/ check for balance)

a) NaCl(aq) + LiNO3(aq) 🡪 LiCl(aq) + NaNO3(aq)

b) AgNO3(aq) + KCl(aq) 🡪 KCl(aq) + AgCl(s)

c) CaCl2(aq) + Na2SO4(aq) 🡪 2NaCl(aq) + CaSO4(s)

d) \_\_2\_Na3PO4(aq) + \_3\_\_Ba(NO3)2🡪 Ba3(PO4)2(s) + 6NaNO3(aq)

b) Write the complete molecular (formula ), complete ionic and net ionic

equations when the components below are mixed: (3 pts)

NaCl(aq), AgNO3(aq)

Complete molecular NaCl(aq) + AgNO3(aq)🡪 AgCl(s) + NaNO3(aq)

Complete ionic Na+ + Cl- + Ag+ + NO3- 🡪 AgCl(s) + Na+ + NO3-

Net ionic Ag+ + Cl- 🡪 AgCl(s)

**2) Acid-Base Theory (11 pts)**

An Arrhenius acid is a \_\_\_H+\_\_\_\_\_\_\_\_donor

An Arrhenius base is a \_\_\_OH‑\_\_\_\_\_\_\_\_donor

A Bronsted acid is a(n) \_\_\_\_proton donor\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A Bronsted base is a(n)\_\_\_\_proton acceptor\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2) acid-base theory (continued)**

Identify the acid (A), base (B), conjugate acid (CA) and conjugate base (CB) in each reaction below: (2 pts each/4 pts total)

**B A CA CB**

a) H2PO4‑ + HNO3 🡪 H3PO4 + NO3-

**A B CB CA**

b) HPO32- + CO32- 🡪 PO33- + HCO3-

acid-base reactions are characterized by:

specialized species defined as acid and base

\_\_\_\_\_\_heat\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_neutralization of acid and base\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_use of indicators\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**3) Redox concepts (13 pts)**

Oxidation => an element \_\_\_loses\_\_\_\_\_\_\_\_electrons

Reduction=> an element \_\_\_gains\_\_\_\_\_\_\_\_ electrons

What are the oxidation numbers of all the elements in the compounds below:

(1 pt each/ 7 pts total)

a) NO3 N oxidation #=\_\_6\_\_ O oxidation # = \_\_-2\_\_\_\_

b) CuCl2 Cu oxidation #=\_2+\_\_ Cl oxidation #=\_\_-1\_\_\_\_

c) H2SO4 H oxidation #=\_1+\_\_O oxidation # =\_\_2-\_\_S oxidation #=\_6+\_

What are elements oxidized and reduced in the reactions below: (4 pts total)

CH4 + 2O2 🡪 CO2 + 2H2O

\_\_C in CH4\_\_\_oxidized \_\_O (in O2\_)\_\_\_ reduced

Ag2O + Zn 🡪 ZnO + 2Ag

\_Zn\_\_\_ oxidized \_\_Ag in Ag2O\_\_\_ reduced