WS 8.5 Single Replacement Reactions! *Name:*_____ *p.*____

$Cu_{(s)}$ + $AgNO_{3(aq)}$ ------> $Cu(NO_3)_2$ ( ) + Ag ( )

Ag + $Cu(NO_3)_2$ ------> No Reaction (N.R.)

Explain how you can use the activity series to determine whether a single replacement reaction can occur:

_____

_____

Complete the reactions in sections 1 and 2. Balance and include phase subscripts.

1. Reaction of metals with ionic compounds or with acids:

a. $Al_{(s)}$ + $CuCl_{2(aq)}$ --------> _____

b. $Al_2(SO_4)_3$ + $Cu_{(s)}$ --------> _____

c. $Cu_{(s)}$ + $HCl_{(aq)}$ --------> _____

d. $Al_{(s)}$ + $HCl_{(aq)}$ --------> _____

f. $Fe(NO_3)_{2\,(aq)}$ + $Al_{(s)}$ --------> _____

g. $Al_2(SO_4)_{3\,(aq)}$ + $Fe_{(s)}$ --------> _____

h. $HNO_{3\,(aq)}$ + $Fe_{(s)}$ --------> _____
(assume that ferric ion forms above)

Activity Series
(for metals and hydrogen)

Li
K
Ba
Sr
Ca
Na
Mg
Al
$H(H_2O)$
Zn
Cr
Fe
Co
Ni
Sn
Pb
H(acid)
Cu
Ag
Hg
Pt
Au

2. Reaction of metals with water:

a. $Na_{(s)}$ + $H_2O_{(l)}$ --------> _____

b. $Zn_{(s)}$ + $H_2O_{(l)}$ --------> _____

c. $H_2O_{(l)}$ + $Ca_{(s)}$ --------> _____

3. Complete the following reactions. You don't need to balance the reactions.
(DO balance ion charges in formulas though, as always!!!!)
Include subscripts on any ELEMENTS that form. 5 of these are N.R.
For this W.S. only, if the metal reacting can form an –ic ion and an –ous ion, assume that the –ous ion forms.

a. $Pb_{(s)}$ + $HCl_{(aq)}$ --------> _____

b. $Al_{(s)}$ + $H_2SO_{4(aq)}$ --------> _____

c. $Cu_{(s)}$ + $H_2SO_{4(aq)}$ --------> _____

d. $K_{(s)}$ + $H_2O_{(l)}$ --------> _____

e. $Al_2(SO_4)_{3(aq)}$ + $Li_{(s)}$ --------> _____

f. $Sn_{(s)}$ + $ZnCl_{2(aq)}$ --------> _____

g. $ZnSO_{4(aq)}$ + $K_{(s)}$ --------> _____

h. $HCl_{(aq)}$ + $Au_{(s)}$ --------> _____

i. $HC_2H_3O_{2(aq)}$ + $Zn_{(s)}$ --------> _____

j. $Zn_{(s)}$ + $Sn(NO_3)_{4(aq)}$ --------> _____

k. $Hg_{(s)}$ + $CrCl_{3(aq)}$ --------> _____

l. $Na_{(s)}$ + $H_3PO_{4(aq)}$ --------> _____

m. $CrCl_{3(aq)}$ + $Mg_{(s)}$ --------> _____

n. $Co_{(s)}$ + $H_2O_{(l)}$ --------> _____

Activity Series
(for metals and hydrogen)

Li
K
Ba
Sr
Ca
Na
Mg
Al
$H(H_2O)$
Zn
Cr
Fe
Co
Ni
Sn
Pb
H(acid)
Cu
Ag
Hg
Pt
Au

4. Single Replacement Reactions where the Element Reacting is a nonmetal: (balance + ss)

a. $F_{2(g)}$ + $NaCl_{(aq)}$ --------> _____

b. $Cl_{2g)}$ + $AlF_{3(aq)}$ --------> _____

c. $Cl_{2g)}$ + $AlBr_{3(aq)}$ --------> _____

5. All the kinds of single replacements! (Balance and do phase subscripts!)

a. $Al_{(s)}$ + $CuBr_{2(aq)}$ -------> _____

b. $F_{2(g)}$ + $CuBr_{2(aq)}$ -------> _____

c. $Ni_{(s)}$ + $HI_{(aq)}$ -------> _____

d. $Sn(SO_4)_{2(aq)}$ + $Al_{(s)}$ -------> _____

e. $H_2O_{(l)}$ + $Mg_{(s)}$ --------> _____

f. $NaI_{(aq)}$ + $Br_{2(l)}$ -------> _____

g. $K_{(s)}$ + $Al(NO_3)_{3(aq)}$ --------> _____

h. $KF_{(aq)}$ + $Br_{2\ (l)}$ -------> _____

i. $Li_{(s)}$ + $CoSO_{4\ (aq)}$ --------> _____

j. $Pt_{\ (s)}$ + $Ag_2SO_{4(aq)}$ --------> _____

k. $HNO_{3(aq)}$ + $Co_{(s)}$ --------> _____

l. $LiBr_{(aq)}$ + $F_{2\ (g)}$ -------> _____

m. $AuNO_{3(aq)}$ + $Mg_{(s)}$ --------> _____

Activity Series
(for halogens)

_____
_____
_____
_____