

Chemistry Unit 8
HW #1 - Acid Base Reactions

Part I. Write a balanced equation for each of the following neutralization reactions.

- Hydrochloric acid plus potassium hydroxide

$$\text{HCl(aq)} + \text{KOH(aq)} \rightarrow \text{H}_2\text{O} + \text{KCl(aq)}$$
- Zinc hydroxide plus nitric acid

$$\text{Zn(OH)}_2(\text{s}) + 2\text{HNO}_3(\text{aq}) \rightarrow 2\text{H}_2\text{O} + \text{Zn(NO}_3)_2(\text{aq})$$
- Magnesium hydroxide plus sulfuric acid

$$\text{Mg(OH)}_2(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{MgSO}_4(\text{aq}) + 2\text{H}_2\text{O}$$
- Cobalt (II) hydroxide plus hydrochloric acid

$$\text{Co(OH)}_2(\text{s}) + 2\text{HCl(aq)} \rightarrow \text{CoCl}_2(\text{aq}) + 2\text{H}_2\text{O}$$
- Acetic acid plus potassium hydroxide

$$\text{KOH(aq)} + \text{HC}_2\text{H}_3\text{O}_2(\text{aq}) \rightarrow \text{KC}_2\text{H}_3\text{O}_2(\text{aq}) + \text{H}_2\text{O}$$
- Phosphoric acid plus sodium hydroxide

$$\text{H}_3\text{PO}_4(\text{aq}) + 3\text{NaOH(aq)} \rightarrow 3\text{H}_2\text{O} + \text{Na}_3\text{PO}_4(\text{aq})$$
- Beryllium hydroxide plus nitric acid

$$\text{Be(OH)}_2(\text{s}) + 2\text{HNO}_3(\text{aq}) \rightarrow \text{Be(NO}_3)_2(\text{aq}) + 2\text{H}_2\text{O}$$
- Aluminum hydroxide plus sulfuric acid

$$2\text{Al(OH)}_3(\text{s}) + 3\text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{Al}_2(\text{SO}_4)_3(\text{s}) + 6\text{H}_2\text{O}$$
- Manganese (IV) hydroxide and carbonic acid

$$\text{Mn(OH)}_4(\text{s}) + 2\text{H}_2\text{CO}_3(\text{aq}) \rightarrow \text{Mn(CO}_3)_2(\text{s}) + 4\text{H}_2\text{O}$$
- Hydrochloric acid and sodium hydroxide

$$\text{HCl(aq)} + \text{NaOH(aq)} \rightarrow \text{H}_2\text{O} + \text{NaCl(aq)}$$

Part II.

Given a salt, it is possible to write a balance equation for an acid-base reaction which would produce the salt, if you remember that the products are the salt and water. For example NaCl can be produced as follows: $\text{HCl} + \text{NaOH} \rightarrow \text{H}_2\text{O} + \text{NaCl}$

Write the balance equation for the reaction that produced the following salts.

- KNO_3 $\text{KOH(aq)} + \text{HNO}_3(\text{aq}) \rightarrow \text{H}_2\text{O} + \text{KNO}_3(\text{aq})$
- $(\text{NH}_4)_2\text{SO}_4$ $2\text{NH}_4\text{OH(aq)} + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow 2\text{H}_2\text{O} + (\text{NH}_4)_2\text{SO}_4$
- Na_2CO_3 $2\text{NaOH(aq)} + \text{H}_2\text{CO}_3(\text{aq}) \rightarrow 2\text{H}_2\text{O} + \text{Na}_2\text{CO}_3(\text{aq})$
- Calcium bromide $\text{Ca(OH)}_2(\text{aq}) + 2\text{HBr(aq)} \rightarrow 2\text{H}_2\text{O} + \text{CaBr}_2(\text{aq})$
- Vanadium (IV) fluoride $\text{V(OH)}_4(\text{aq}) + 4\text{HF(aq)} \rightarrow 4\text{H}_2\text{O} + \text{VF}_4(\text{aq})$