Chapter 6: Chemical Reactions, An Introduction *draft copy*

Example Reactions. Show Balanced Equations Only

Hydrochloric Acid and Cobalt (II) Nitrate	$HCl + Co(NO_3)_2 \rightarrow CoCl_2 + HNO_3$
Sodium Dichromate and Lead (II) Nitrate	$Na_2Cr_2O_7 + Pb(NO_3)_2 \rightarrow PbCr_2O_7$ ppt $+ 2\ NaNO_3$
Methane and Oxygen [Burn Methane]	$CH_4 + 2\ O_2 \rightarrow CO_2 + 2$ H-OH
Hydrofluoric Acid and silicon Dioxide	$HF + SiO_2 \rightarrow SiF_4 + H_2O$
Hydrochloric Acid and Sodium Hydroxide	$HCl + NaOH \rightarrow NaCl +$ H-OH
Sulfuric Acid and Potassium Hydroxide	$H_2SO_4 + 2\ KOH \rightarrow K_2SO_4 + 2$ H-OH
Phosphoric Acid and Magnesium Hydroxide	$H_3PO_4 + Mg(OH)_2 \rightarrow Mg_3(PO_4)_2 +$ H-OH
Sulfuric Acid and Aluminum Hydroxide	$H_2SO_4 + Al(OH)_3 \rightarrow Al_2(SO_4)_3 +$ H-OH
Silver Nitrate and Sodium Chloride	$AgNO3 + NaCl \rightarrow AgCl \downarrow + NaNO3$
Silver Nitrate and Barium Chloride	$2\ AgNO3 + BaCl2 \rightarrow 2\ AgCl \downarrow + 2\ NaNO3$
Copper (I) Sulfite and Phosphoric Acid	$Cu_2SO_3 + H_3PO_4 \rightarrow Cu_3PO_4 + H_2SO_3$
Copper (II) Hypochlorite and Nitric Acid	$Cu(ClO)_2 + 2\ HNO_3 \rightarrow Cu(NO_3)_2 + 2$ HClO
Iron (II) Chlorate and Potassium Hydroxide	$Fe(ClO_3)_2 + KOH \rightarrow Fe(OH)_2 + KClO_3$
Iron (III) Carbonate and Sulfuric Acid	$Fe_2(CO_3)_3 \downarrow + H_2SO_4 \rightarrow FeSO_4 + H_2CO_3$
Cobalt (II) Nitrate and Sodium Iodide	$Co(NO_3)_2 + NaI \rightarrow CoI_2 + NaNO_3$
Cobalt (III) Sulfate and Barium Carbonate	$Co_2(SO_4)_3 + BaCO_3 \rightarrow Co_2(CO_3)_3 + BaSO_4$
Tin (II) Hydroxide and Magnesium Phosphate	$Sn(OH)_2 + Mg_3(PO_4)_2 \rightarrow SnPO_4 + Mg(OH)_2$
Tin (IV) Bisulfate and Cobalt (II) Chromate	$Sn(HSO_4)_4 + CoCrO_4 \rightarrow Sn(CrO_4)_2 + Co(HSO_4)_2$
Lead (II) Acetate and Iron (III) Chromate	$Pb(C_2H_3O_2)_2 + Fe_2(CrO_4)_3 \rightarrow PbCrO_4 + Fe(C_2H_3O_2)_3$
Lead (IV) Permanganate and Iron (III) Cyanide	$Pb(MnO_4)_4 + Fe(CN)_3 \rightarrow Pb(CN)_4 + Fe(MnO_4)_3$
Ammonium Dichromate and Iron (III) Permanganate	

$(NH_4)_2Cr_2O_7 + Fe(MnO_4)_3 \rightarrow NH_4MnO_4 + Fe_2(Cr_2O_7)_3$

Lithium Chromate and Silver Phosphate $Li_2CrO_4 + Ag_3PO_4 \rightarrow Li_3PO_4 + Ag_2CrO_4$

Zinc Bicarbonate and Lithium Hydrogen Phosphate $Zn(HCO_3)_2 + Li_2HPO_4 \rightarrow ZnHPO_4 + LiHCO_3$

Magnesium Hydroxide and Hydrochloric Acid $Mg(OH)_2 + HCl \rightarrow MgCl_2 + 2\ H\text{-}OH$

Silver Nitrate and Copper (II) Chloride $AgNO_3 + CuCl_2 \rightarrow AgCl + Cu(NO_3)_2$

Iron (II) Phosphate and Aluminum Hydroxide $Fe_3(PO_4)_2 + Al(OH)_2 \rightarrow Fe(OH)_3 + AlPO_4$

Cobalt (III) Sulfate and Potassium Chloride $Co_2(SO_4)_3 + KCl \rightarrow CoCl_2 + K_2SO_4$

Ammonium Perchlorate and Sodium Hydroxide $NH_4ClO_4 + NaOH \rightarrow NH_4OH + NaClO_4$

Calcium Hydroxide and Hydrochloric Acid $Ca(OH)_2 + HCl \rightarrow CaCl_2 + H\text{-}OH$

Sulfuric Acid and Iron (III) Hydroxide $H_2SO_4 + Fe(OH)_3 \rightarrow Fe_2(SO_4)_3 + H\text{-}OH$

Copper (II) Carbonate and Phosphoric Acid $CuCO_3 + H_3PO_4 \rightarrow Cu_3(PO_4)_3 + H_2CO_3$

Potassium Dichromate and Lithium Chloride $K_2Cr_2O_7 + LiCl \rightarrow KCl + Li_2Cr_2O_7$

<u>Balance the following and say if the reaction will go to completion and why?</u>
If it does go to completion, show complete ionic and net ionic reactions

Sodium Chloride and Magnesium Bromide

Potassium Hydroxide and Iron (III) Chloride

Barium Nitrate and Potassium Phosphate $3\ Ba(NO_3)_2 + 2\ K_3PO_4 \rightarrow Ba_3(PO_4)_2 \downarrow + 6\ KNO_3$

Sodium Sulfate and Potassium Chloride NR

Nickel (II) Nitrate and Potassium Carbonate $Ni(NO_3)_2 + K_2CO_3 \rightarrow NiCO_3 \downarrow + 2\ KNO_3$

Sodium Sulfide and Copper (II) Nitrate $Na_2S + Cu(NO_3)_2 \rightarrow CuS \downarrow + 2\ NaNO_3$

Ammonium Chloride and Lead (II) Nitrate $2\ NH_4Cl + Pb(NO_3)_3 \rightarrow PbCl_2 \downarrow + 2\ NH_4NO_3$

Nickel Chloride and Lithium Carbonate $NiCl_2 + Li_2CO_3 \rightarrow NiCO_3 + 2\ LiCl$

Lead (II) Nitrate and Potassium Iodide $Pb(NO_3)_2 + 2\ KI \rightarrow PbI_2 \downarrow + 2\ KNO_3$

Barium Chloride and Sodium Sulfate $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 \downarrow + 2\ NaCl$

Copper (II) Chloride and Sodium Carbonate $CuCl_2 + Na_2CO_3 \rightarrow CuCO_3 \downarrow + 2\ NaCl$

Hydrochloric Acid and Lithium Hydroxide $HCl + LiOH \rightarrow LiCl + H\text{-}OH$

Sulfuric Acid and Calcium Hydroxide $H_2SO_4 + Ca(OH)_2 \rightarrow CaSO_4 + 2\ H\text{-}OH$

Zinc and Hydrochloric Acid Redox $Zn + HCl \rightarrow ZnCl_2 + H_2 \uparrow$

Aluminum oxidizes with Oxygen to form oxide Redox $Al + O_2 \rightarrow Al_2O_3$

Sodium reacts with Oxygen to form Sodium Oxide REDOX $Na + O_2 \rightarrow 2\ Na_2O$

Hydrochloric Acid and Sodium Carbonate $2\ HCl + Na_2CO_3 \rightarrow CO_2 \downarrow + H_2O + NaCl$

Hydrogen and Oxygen burn to for water REDOX $2\ H_2 + O_2 \rightarrow 2\ H_2O$

Water decomposes to Hydrogen and Oxygen REDOX $2\ H_2O \rightarrow 2\ H_2 + O_2 \uparrow$

Mercury (II) Oxide decompose to Mercury and Oxygen REDOX $2\ HgO \rightarrow 2\ Hg + O_2 \uparrow$

Barium Chloride and Sodium Sulfate $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 \downarrow + 2\ NaCl$

Iron (III) Chloride and Phosphoric Acid $FeCl_3 + H_3PO_4 \rightarrow$

Barium Nitrate and Sodium Sulfate $Ba(NO_3)_2 + Na_2SO_4 \rightarrow$