1. KT6 5.P.003. [489832]  
Which compound or compounds in each of the following groups is (are) expected to be soluble in water? (Select all that apply.)

(a)  
PbCO₃  
PbSO₄  
Pb(NO₃)₂

(b)  
NaCH₃CO₂  
NaClO₄  
Na₂SO₄

(c)  
AgBr  
KBr  
Al₂Br₆

2. KT6 5.P.011. [467604]  
Predict the products of each precipitation reaction, and then balance the completed equation. (Type your answers using the format CH₄ for CH₄. Use the lowest possible coefficients.)

(a)  
Mn(NO₃)₂(aq) + Na₃PO₄(aq) → S(s) + (aq)

(b)  
NiCl₂(aq) + (NH₄)₂S(aq) → S(s) + (aq)

3. KT6 5.P.013. [467443]  
Write a balanced equation for the ionization of nitric acid in water. (Type your answer using the format [PO₄]³⁻ for PO₄³⁻. Use the lowest possible coefficients.)

4. KT6 5.P.014. [489846]  
Write a balanced equation for the ionization of perchloric acid in water. (Type your answer using the format [CO₃]²⁻ for CO₃²⁻. Use the lowest possible coefficients.)
5. KT6 5.P.020. [489863]  Show Details

Complete and balance the following acid-base reactions. Name the reactants and products. (Type your answer using the format CO2 for CO.) Use the lowest possible coefficients.

(a) \( \text{H}_3\text{PO}_4(aq) + \text{KOH}(aq) \rightarrow \text{H}_2\text{O}(aq) + \text{K}_2\text{HPO}_4(l) \)

(b) \( \text{H}_2\text{C}_2\text{O}_4(aq) + \text{Ca(OH)}_2(s) \rightarrow \text{CaCO}_3(s) + \text{H}_2\text{O}(aq) \)

(H\text{C}_2\text{O}_4 is oxalic acid, an acid capable of donating two H\(^+\) ions.)

6. KT6 5.P.028. [489875]  Show Details

The beautiful red mineral rhodochrosite is manganese(II) carbonate. Write an overall balanced equation for the reaction of the mineral with nitric acid. Name each reactant and product. (Type your answer using the format CH4 for CH.) Use the lowest possible coefficients.

\( \text{MnCO}_3(s) + \text{HNO}_3(aq) \rightarrow \text{Mn(NO}_3)_2(aq) + \text{CO}_2(g) + \text{H}_2\text{O}(l) \)

7. KT6 5.P.029. [467341]  Show Details

Balance the following reactions and then classify each one as a precipitation, acid-base reaction, or gas-forming reaction.

(a) \( \text{Ba(OH)}_2(s) + \text{HCl}(aq) \rightarrow \text{BaCl}_2(aq) + \text{H}_2\text{O}(l) \)

(b) \( \text{HNO}_3(aq) + \text{CoCO}_3(s) \rightarrow \text{Co(NO}_3)_2(aq) + \text{H}_2\text{O}(l) + \text{CO}_2(g) \)

(c) \( \text{Na}_3\text{PO}_4(aq) + \text{Cu(NO}_3)_2(aq) \rightarrow \text{Cu}_3\text{PO}_4_2(s) + \text{NaNO}_3(aq) \)
Determine the oxidation number of each element in the following ions or compounds.

(a) BrO$_3^-$

(b) C$_2$O$_4^{2-}$

(c) F$_2$

(d) CaH$_2$

(e) H$_4$SiO$_4$

(f) SO$_4^{2-}$

In the following reactions, decide which reactant is oxidized and which is reduced. Designate the oxidizing agent and reducing agent.

(a) C$_2$H$_4(g)$ + 3 O$_2(g)$ $\rightarrow$ 2 CO$_2(g)$ + 2 H$_2$O(g)

(b) Si(s) + 2 Cl$_2(g)$ $\rightarrow$ SiCl$_4(l)$

Some potassium dichromate (K$_2$Cr$_2$O$_7$), 2.325 g, is dissolved in enough water to make exactly 490 mL of solution. What is the molar concentration of the potassium dichromate?

M
What are the molar concentrations of the K$^+$ and Cr$_2$O$_7^{2-}$ ions?

K$^+$ \[ \boxed{\text{ } M} \]

Cr$_2$O$_7^{2-}$ \[ \boxed{\text{ } M} \]