Solution

1.) Write an equation for the dissociation of each of the following in water
a.) $BaCl_2$ (s) → Ba^{2+} (aq) + 2 Cl^- (aq)
b.) $AgNO_3$ (s) → Ag^+ (aq) + NO_3^- (aq)
c.) $Mg(OH)_2$ (s) ⇌ Mg(OH)2 (s) *(insoluble)*
d.) Na_2SO_4 (s) → 2 Na^+ (aq) + SO_4^{2-} (aq)
e.) NH_4NO_3 (s) → NH_4^+ (aq) + NO_3^- (aq)
f.) $(NH_4)_3PO_4$ (s) → 3 NH_4^+ (aq) + PO_4^{3-} (aq)

2.) Which of the above solutions are electrical conductors
All of them are conductors **except** $Mg(OH)_2$

3.) If 1.00 L of a 1.00 mol/L solution of $AgNO_3$ was mixed, then
a.) [Ag^+] = 1.00 mol/L
b.) [NO_3^-] = 1.00 mol/L

4.) If 500.0 mL of a 1.00 mol/L solution of $BaCl_2$ was mixed, then
a.) Moles of Ba^{2+} = 0.500 mol
b.) [Ba^{2+}] = 1.00 mol/L
c.) Moles of Cl^- = 1.00 mol *(2 moles per mole of $BaCl_2$)*
d.) [Cl^-] = 2.00 mol/L

5.) If 500.0 mL of 1.00 mol/L NaCl was added to the solution in question 4, then
(New total volume = 1000.0 mL = 1.00 L)

a.) [Ba^{2+}] = 0.500 mol ÷ 1.00 L = **0.500 mol/L**
b.) [Cl^-] = (1.00 mol from $BaCl_2$ + 0.500 mol from NaCl) ÷ 1.00 L = **1.50 mol/L**

More solutions

1.) For each of the following combinations of equal volumes of 0.2 mol/L aqueous solutions
 1.) Identify the possible products by formula
 2.) State which (if any) product has a low solubility (will precipitate)
 3.) If there **is** a precipitate, write the formula equation and net ionic equation for the reaction

a.) $MgS + Sr(OH)_2$
 1.) $Mg(OH)_2$ (s) + SrS (aq)
 2.) $Mg(OH)_2$ (s)
 3.) $MgS\ (aq) + Sr(OH)_2\ (aq) \rightarrow Mg(OH)_2\ (s) + SrS\ (aq)$
 $Mg^{2+}\ (aq) + 2\ OH^-\ (aq) \rightarrow Mg(OH)_2\ (s)$

b.) $CuBr_2 + Pb(NO_3)_2$
 1.) $Cu(NO_3)_2\ (aq) + PbBr_2\ (s)$
 2.) $PbBr_2$ (s)
 3.) $CuBr_2\ (aq) + Pb(NO_3)_2\ (aq) \rightarrow Cu(NO_3)_2\ (aq) + PbBr_2\ (s)$
 $Pb^{2+}\ (aq) + 2\ Br^-\ (aq) \rightarrow PbBr_2\ (s)$

c.) $FeBr_3 + SrI_2$
 1.) $FeI_3\ (aq) + SrBr_2\ (aq)$
 2.) Neither

d.) $Ba(NO_3)_2 + Li_2SO_4$
 1.) $BaSO_4\ (s) + LiNO_3\ (aq)$
 2.) $BaSO_4$ (s)
 3.) $Ba(NO_3)_2\ (aq) + Li_2SO_4\ (aq) \rightarrow BaSO_4\ (s) + 2\ LiNO_3\ (aq)$
 $Ba^{2+}\ (aq) + SO_4^{2-}\ (aq) \rightarrow BaSO_4\ (s)$

e.) $K_3PO_4 + CuCl_2$
 1.) $6\ KCl\ (aq) + Cu_3(PO_4)_2\ (s)$
 2.) $Cu_3(PO_4)_2$ (s)
 3.) $2\ K_3PO_4\ (aq) + 3\ CuCl_2\ (aq) \rightarrow 6\ KCl\ (aq) + Cu_3(PO_4)_2\ (s)$
 $3\ Cu^{2+}\ (aq) + 2\ PO_4^{3-}\ (aq) \rightarrow Cu_3(PO_4)_2\ (s)$

f.) Zinc (II) sulphate and lithium carbonate
 1.) $ZnCO_3\ (s) + Li_2SO_4\ (aq)$
 2.) $ZnCO_3$ (s)
 3.) $ZnSO_4\ (aq) + Li_2CO_3\ (aq) \rightarrow ZnCO_3\ (s) + Li_2SO_4\ (aq)$
 $Zn^{2+}\ (aq) + CO_3^{2-}\ (aq) \rightarrow ZnCO_3\ (s)$

g.) Iron (III) nitrate and magnesium sulphide
 1.) $Fe_2S_3\ (s) + Mg(NO_3)_2\ (aq)$
 2.) Fe_2S_3 (s)

h.) Beryllium sulphate and ammonium carbonate

1.) $BeCO_3$ (s) + $(NH_4)_2SO_4$ (aq)

2.) $BeCO_3$ (s)

3.) $BeSO_4$ (aq) + $(NH_4)_2CO_3$ (aq) → $BeCO_3$ (s) + $(NH_4)_2SO_4$ (aq)

Be^{2+} (aq) + CO_3^{2-} (aq) → $BeCO_3$ (s)

i.) Cobalt (II) sulphate and lithium carbonate

1.) $CoCO_3$ (s) + Li_2SO_4 (aq)

2.) $CoCO_3$ (s)

3.) $CoSO_4$ (aq) + Li_2CO_3 (aq) → $CoCO_3$ (s) + Li_2SO_4 (aq)

Co^{2+} (aq) + CO_3^{2-} (aq) → $CoCO_3$ (s)

j.) Magnesium sulphate and strontium hydroxide

1.) $Mg(OH)_2$ (s) + $SrSO_4$ (s)

2.) $Mg(OH)_2$ (s)

3.) $MgSO_4$ (aq) + $Sr(OH)_2$ (aq) → $Mg(OH)_2$ (s) + $SrSO_4$ (s)

Mg^{2+} (aq) + 2 OH^- (aq) → $Mg(OH)_2$ (s)

Sr^{2+} (aq) + SO_4^{2-} (aq) → $SrSO_4$ (s)