HW #23 p458 #1, 2, 5, 8, 9, 11, 13

(1) $KCl_{(s)} \rightarrow K^+_{(aq)} + Cl^-_{(aq)}$
1mol 1mol 1mol = 2mol total ions

$M = \frac{x\ mol}{1L}$ 1mol = x

$Mg(NO_3)_{2\,(s)} \rightarrow Mg^{+2}_{(aq)} + 2NO_3^-{}_{(aq)}$
1mol 1mol 2mol = 3mol total ions

(2)
a soluble
b soluble
c insoluble
d insoluble
e insoluble
f soluble
g soluble
h insoluble
i insoluble
j soluble

(3) A STRONG ELECTROLYTE IONIZES (DISSOCIATES) 100% and carries an electrical current well. It is very soluble

A weak electrolyte partially ionizes (slightly soluble) and does not carry a current well.

(6) (A) $KI_{(s)} \rightarrow \overset{1mol}{K^+_{(aq)}} + \overset{1mol}{I^-_{(aq)}}$ 2mol total

(B) $NaNO_{3\,(s)} \rightarrow \overset{1mol}{Na^+_{(aq)}} + \overset{1mol}{NO_3^-{}_{(aq)}}$ 2mol total

(C) $MgCl_{2\,(s)} \rightarrow \overset{1mol}{Mg^{+2}_{(aq)}} + \overset{2mol}{2Cl^-_{(aq)}}$ 3mol total

(D) $Na_2SO_{4\,(s)} \rightarrow \overset{2mol}{2Na^+_{(aq)}} + \overset{1mol}{SO_4^{-2}{}_{(aq)}}$ 3mol total

(9) see products above

(11) (A) $HgCl_{2\,(aq)} + K_2S_{(aq)} \rightarrow 2KCl_{(aq)} + HgS_{(s)}$

$Hg^{+2}_{(aq)} + S^{-2}_{(aq)} \rightarrow HgS_{(s)}$

spectators: K^+, Cl^- ~~Hg^{+2}, S^{-2}~~

precipitate: HgS

(B) $Na_2CO_{3\,(aq)} + CaCl_{2\,(aq)} \rightarrow 2NaCl_{(aq)} + CaCO_{3\,(s)}$

$CO_3^{-2}{}_{(aq)} + Ca^{+2}{}_{(aq)} \rightarrow CaCO_{3\,(s)}$

spectators: Na^+, Cl^-

precipitate: $CaCO_3$

(C) $3CuCl_{2\,(aq)} + 2(NH_4)_3PO_{4\,(aq)} \rightarrow Cu_3(PO_4)_{2\,(s)} + 6NH_4Cl_{(aq)}$

$3Cu^{+2}{}_{(aq)} + 2PO_4^{-3}{}_{(aq)} \rightarrow Cu_3(PO_4)_{2\,(s)}$

spectator: NH_4^+, ~~Cl^-~~

precipitate: $Cu_3(PO_4)_2$

(13) $CuCl_{2(aq)} + Pb(NO_3)_2 \rightarrow PbCl_{2(s)} + Cu(NO_3)_{2(aq)}$

~~$Cu^{+2}_{(aq)}$~~ $2Cl^{-1}_{(aq)} + Pb^{+2}_{(aq)} \rightarrow PbCl_{2(s)}$

$$13.45g\ CuCl_2 \times \frac{1mol\ CuCl_2}{134.45g} \times \frac{1mol\ PbCl_2}{1mol\ CuCl_2} \times \frac{278.10g}{1mol\ PbCl_2} = \boxed{27.81g\ PbCl_2}$$