YOU MUST STAPLE YOUR PAGES TOGETHER NO STAPLE = NO CREDIT!!!! You CAN circle your answers on this page and turn it in.

Circle anything that applies (**there may be more than on thing circled in each problem**):

1) dinitrogen pentoxide:	soluble salt	insoluble salt	strong acid	weak acid	**molecular compound**	SE	WE	**NE**
2) barium sulfate:	soluble salt	**insoluble salt**	strong acid	weak acid	molecular compound	SE	**WE**	NE
3) mercury (II) bromide:	**soluble salt**	insoluble salt	strong acid	weak acid	molecular compound	**SE**	WE	NE
4) acetic acid:	soluble salt	insoluble salt	strong acid	**weak acid**	molecular compound	SE	**WE**	NE
5) hydroiodic acid:	soluble salt	insoluble salt	**strong acid**	weak acid	molecular compound	**SE**	WE	NE
6) carbon dioxide:	soluble salt	insoluble salt	strong acid	weak acid	**molecular compound**	SE	WE	**NE**
7) nitric acid:	soluble salt	insoluble salt	**strong acid**	weak acid	molecular compound	**SE**	WE	NE
8) sulfuric acid:	soluble salt	insoluble salt	**strong acid**	weak acid	molecular compound	**SE**	WE	NE
9) ammonium oxalate:	**soluble salt**	insoluble salt	strong acid	weak acid	molecular compound	**SE**	WE	NE
10) nickel (II) phosphate:	soluble salt	**insoluble salt**	strong acid	weak acid	molecular compound	SE	**WE**	NE
11) perchloric acid:	soluble salt	insoluble salt	**strong acid**	weak acid	molecular compound	**SE**	WE	NE
12) lithium chromate:	**soluble salt**	insoluble salt	strong acid	weak acid	molecular compound	**SE**	WE	NE
13) silver chloride:	soluble salt	**insoluble salt**	strong acid	weak acid	molecular compound	SE	**WE**	NE
14) strontium hydroxide:	**soluble salt**	insoluble salt	strong acid	weak acid	molecular compound	**SE**	WE	NE
15) pure water:	soluble salt	insoluble salt	strong acid	weak acid	**molecular compound**	SE	WE	**NE**
16) lead (II) acetate:	**soluble salt**	insoluble salt	strong acid	weak acid	molecular compound	**SE**	WE	NE
17) nitrous acid:	soluble salt	insoluble salt	strong acid	**weak acid**	molecular compound	SE	**WE**	NE
18) hydrocyanic acid:	soluble salt	insoluble salt	strong acid	**weak acid**	molecular compound	SE	**WE**	NE
19) hydrofluoric acid:	soluble salt	insoluble salt	strong acid	**weak acid**	molecular compound	SE	**WE**	NE
20) sodium oxide:	**soluble salt**	insoluble salt	strong acid	weak acid	molecular compound	**SE**	WE	NE

DO *NOT* WRITE YOUR ANSWERS FOR THIS SECTION ON THIS SHEET (please do NOT turn in this page), PLEASE USE A SEPARATE PIECE OF PAPER AND WRITE NEATLY.

Write the net ionic equation for each of the following reactions (assume all are in water solution):

1) $2\ Al(OH)_{3(s)} + 3\ H_2SO_{4(aq)} \rightarrow Al_2(SO_4)_{3(aq)} + 6\ H_2O_{(l)}$
$2\ Al(OH)_{3(s)} + 6\ H^+_{(aq)} + 3\ SO_4^{2-}{}_{(aq)} \rightarrow 2Al^{3+}{}_{(aq)} + 3\ SO_4^{2-}{}_{(aq)} + 6\ H_2O_{(l)}$
$2\ Al(OH)_{3(s)} + 6\ H^+_{(aq)} \rightarrow 2Al^{3+}{}_{(aq)} + 6\ H_2O_{(l)}$

2) $(NH_4)_2S_{(aq)} + Li_2O_{(aq)} \rightarrow (NH_4)_2O_{(aq)} + Li_2S_{(aq)}$
$2\ NH_4^+{}_{(aq)} + S^{2-}{}_{(aq)} + 2\ Li^+{}_{(aq)} + O^{2-}{}_{(aq)} \rightarrow 2\ NH_4^+{}_{(aq)} + O^{2-}{}_{(aq)} + 2\ Li^+{}_{(aq)} + S^{2-}{}_{(aq)}$
No reaction

3) $2\ KOH_{(aq)} + H_2SeO_{4(aq)} \rightarrow 2\ H_2O_{(l)} + K_2SeO_{4(aq)}$
$2\ K^+_{(aq)} + 2\ OH^-_{(aq)} + H_2SeO_{4(aq)} \rightarrow 2\ H_2O_{(l)} + 2\ K^+_{(aq)} + SeO_4^{2-}{}_{(aq)}$
$2\ OH^-_{(aq)} + H_2SeO_{4(aq)} \rightarrow 2\ H_2O_{(l)} + SeO_4^{2-}{}_{(aq)}$

4) $HBr_{(aq)} + AgNO_{3(aq)} \rightarrow HNO_{3(aq)} + AgBr_{(s)}$
$H^+_{(aq)} + Br^-_{(aq)} + Ag^+_{(aq)} + NO_3^-{}_{(aq)} \rightarrow H^+_{(aq)} + NO_3^-{}_{(aq)} + AgBr_{(s)}$
$Br^-_{(aq)} + Ag^+_{(aq)} \rightarrow AgBr_{(s)}$

5) $2\ HNO_{3(aq)} + Ca(OH)_{2(aq)} \rightarrow 2\ H_2O_{(l)} + Ca(NO_3)_{2(aq)}$
$2\ H^+_{(aq)} + 2\ NO_3^-{}_{(aq)} + Ca^{2+}{}_{(aq)} + 2\ OH^-_{(aq)} \rightarrow 2\ H_2O_{(l)} + Ca^{+2}{}_{(aq)} + 2\ NO_3^-{}_{(aq)}$
$H^+_{(aq)} + OH^-_{(aq)} \rightarrow H_2O_{(l)}$

6) $3\ Rb_2CrO_{4(aq)} + 2\ Cr(C_2H_3O_2)_{3(aq)} \rightarrow 6\ RbC_2H_3O_{2(aq)} + Cr_2(CrO_4)_{3(s)}$
$6\ Rb^+_{(aq)} + 3\ CrO_4^{2-}{}_{(aq)} + 2\ Cr^{3+}{}_{(aq)} + 6\ C_2H_3O_2^-{}_{(aq)} \rightarrow 6\ Rb^+_{(aq)} + 6\ C_2H_3O_2^-{}_{(aq)} + Cr_2(CrO_4)_{3(s)}$
$3\ CrO_4^{2-}{}_{(aq)} + 2\ Cr^{3+}{}_{(aq)} \rightarrow Cr_2(CrO_4)_{3(s)}$

7) $4\ (NH_4)_3PO_{4(aq)} + 3\ Mn(SO_4)_{2(aq)} \rightarrow 6\ (NH_4)_2SO_{4(aq)} + Mn_3(PO_4)_{4\ (s)}$
$12\ NH_4^+{}_{(aq)} + 4\ PO_4^{3-}{}_{(aq)} + 3\ Mn^{+4}{}_{(aq)} + 6\ SO_4^{2-}{}_{(aq)} \rightarrow 12\ NH_4^+{}_{(aq)} + 6\ SO_4^{2-}{}_{(aq)} + Mn_3(PO_4)_{4\ (s)}$
$4\ PO_4^{3-}{}_{(aq)} + 3\ Mn^{+4}{}_{(aq)} \rightarrow Mn_3(PO_4)_{4\ (s)}$

8) $Cs_3AsO_{4(aq)} + K_2SO_{3(aq)} \rightarrow Cs_2SO_{3(aq)} + K_3AsO_{4(aq)}$
All are soluble salts (each one contains a group 1 metal), so **NO REACTION**

9) $MgO_{(s)} + 2\ HI_{(aq)} \rightarrow MgI_{2(aq)} + H_2O_{(l)}$
$MgO_{(s)} + 2\ H^+_{(aq)} + 2\ I^-_{(aq)} \rightarrow Mg^{2+}{}_{(aq)} + 2\ I^-_{(aq)} + H_2O_{(l)}$
$MgO_{(s)} + 2\ H^+_{(aq)} \rightarrow Mg^{2+}{}_{(aq)} + H_2O_{(l)}$

10) $Li_2SO_{4(aq)} + Ba(NO_3)_{2(aq)} \rightarrow 2\ LiNO_{3(aq)} + BaSO_{4(s)}$
$2\ Li^+_{(aq)} + SO_4^{2-}{}_{(aq)} + Ba^{2+}{}_{(aq)} + 2\ NO_3^-{}_{(aq)} \rightarrow 2\ Li^+_{(aq)} + 2\ NO_3^-{}_{(aq)} + BaSO_{4(s)}$
$SO_4^{2-}{}_{(aq)} + Ba^{2+}{}_{(aq)} \rightarrow BaSO_{4(s)}$

11) $NaOH_{(aq)} + HC_7H_5O_{2(aq)} \rightarrow NaC_7H_5O_2 + H_2O_{(l)}$
$Na^+_{(aq)} + OH^-_{(aq)} + HC_7H_5O_{2(aq)} \rightarrow Na^+_{(aq)} + C_7H_5O_2^-{}_{(aq)} + H_2O_{(l)}$
$OH^-_{(aq)} + HC_7H_5O_{2(aq)} \rightarrow C_7H_5O_2^-{}_{(aq)} + H_2O_{(l)}$

12) $Mg_{(s)} + 2\ HC_2H_3O_{2(aq)} \rightarrow Mg(C_2H_3O_2)_{2(aq)} + H_{2(g)}$
$Mg_{(s)} + 2\ HC_2H_3O_{2(aq)} \rightarrow Mg^{2+}{}_{(aq)} + 2\ C_2H_3O_2^-{}_{(aq)} + H_{2(g)}$
$Mg_{(s)} + 2\ HC_2H_3O_{2(aq)} \rightarrow Mg^{2+}{}_{(aq)} + 2\ C_2H_3O_2^-{}_{(aq)} + H_{2(g)}$

13) $Fe_2(CO_3)_{3(s)} + 6\ HClO_{3(aq)} \rightarrow 2\ Fe(ClO_3)_{3(aq)} + 3\ H_2O_{(l)} + 3\ CO_{2(g)}$
$Fe_2(CO_3)_{3(s)} + 6\ HClO_{3(aq)} \rightarrow 2\ Fe^{3+}{}_{(aq)} + 6\ ClO_3^-{}_{(aq)} + 3\ H_2O_{(l)} + 3\ CO_{2(g)}$
$Fe_2(CO_3)_{3(s)} + 6\ HClO_{3(aq)} \rightarrow 2\ Fe^{3+}{}_{(aq)} + 6\ ClO_3^-{}_{(aq)} + 3\ H_2O_{(l)} + 3\ CO_{2(g)}$
NOTE: Treating $HClO_{3(aq)}$ as a strong acid here is acceptable also.

14) $2\ NaF_{(aq)} + Ca(NO_3)_{2(aq)} \rightarrow 2\ NaNO_{3(aq)} + CaF_{2(s)}$
$2\ Na^+_{(aq)} + 2\ F^-_{(aq)} + Ca^{2+}{}_{(aq)} + 2\ NO_3^-{}_{(aq)} \rightarrow 2\ Na^+_{(aq)} + 2\ NO_3^-{}_{(aq)} + CaF_{2(s)}$
$2\ F^-_{(aq)} + Ca^{2+}{}_{(aq)} \rightarrow CaF_{2(s)}$

15) $2\ TiI_{3(aq)} + 3\ Hg_2(C_2H_3O_2)_{2(aq)} \rightarrow 2\ Ti(C_2H_3O_2)_{3(aq)} + 3\ Hg_2I_{2(s)}$
$2\ Ti^{3+}_{(aq)} + 6\ I^-_{(aq)} + 3\ Hg_2^{2+}{}_{(aq)} + 6\ C_2H_3O_2^-{}_{(aq)} \rightarrow 2\ Ti^{3+}_{(aq)} + 6\ C_2H_3O_2^-{}_{(aq)} + 3\ Hg_2I_{2(s)}$
$2\ I^-_{(aq)} + Hg_2^{2+}{}_{(aq)} \rightarrow Hg_2I_{2(s)}$

16) $3\ Bi(ClO_3)_{5(aq)} + 5\ Al(NO_3)_{3(aq)} \rightarrow 3\ Bi(NO_3)_{5(aq)} + 5\ Al(ClO_3)_{3(aq)}$
All are soluble salts (see rule #2), so **NO REACTION!!**

17) $Ca(HCO_3)_{2(s)} + 2\ HBr_{(aq)} \rightarrow CaBr_{2(aq)} + 2\ H_2O_{(l)} + 2\ CO_{2(g)}$
$Ca(HCO_3)_{2(s)} + 2\ H^+_{(aq)} + 2\ Br^-_{(aq)} \rightarrow Ca^{2+}_{(aq)} + 2\ Br^-_{(aq)} + 2\ H_2O_{(l)} + 2\ CO_{2(g)}$
$Ca(HCO_3)_{2(s)} + 2\ H^+_{(aq)} \rightarrow Ca^{2+}_{(aq)} + 2\ H_2O_{(l)} + 2\ CO_{2(g)}$

18) $H_2S_{(g)} + CdCl_{2(aq)} \rightarrow 2\ HCl_{(aq)} + CdS_{(s)}$
$H_2S_{(g)} + Cd^{2+} + 2\ Cl^-_{(aq)} \rightarrow 2\ H^+_{(aq)} + 2\ Cl^-_{(aq)} + CdS_{(s)}$
$H_2S_{(g)} + Cd^{2+} \rightarrow 2\ H^+_{(aq)} + CdS_{(s)}$

19) $Li_2C_2O_{4(aq)} + Ca(ClO_4)_{2(aq)} \rightarrow 2\ LiClO_{4(aq)} + CaC_2O_{4(s)}$
$2\ Li^+_{(aq)} + C_2O_4^{2-}{}_{(aq)} + Ca^{2+}_{(aq)} + 2\ ClO_4^-{}_{(aq)} \rightarrow 2\ Li^+_{(aq)} + 2\ ClO_4^-{}_{(aq)} + CaC_2O_{4(s)}$
$C_2O_4^{2-}{}_{(aq)} + Ca^{2+}_{(aq)} \rightarrow CaC_2O_{4(s)}$

20) $Sr(OH)_{2(aq)} + 2\ HCl_{(aq)} \rightarrow SrCl_{2(aq)} + H_2O_{(l)}$
$Sr^{2+}_{(aq)} + 2\ OH^-_{(aq)} + 2\ H^+_{(aq)} + 2\ Cl^-_{(aq)} \rightarrow Sr^{2+}_{(aq)} + 2\ Cl^-_{(aq)} + 2\ H_2O_{(l)}$
$OH^-_{(aq)} + H^+_{(aq)} \rightarrow H_2O_{(l)}$

21) $H_2C_2O_{4(aq)} + Ba(OH)_{2(aq)} \rightarrow 2\ H_2O_{(l)} + BaC_2O_{4(s)}$
$H_2C_2O_{4(aq)} + Ba^{2+}_{(aq)} + 2\ OH^-_{(aq)} \rightarrow 2\ H_2O_{(l)} + BaC_2O_{4(s)}$
$H_2C_2O_{4(aq)} + Ba^{2+}_{(aq)} + 2\ OH^-_{(aq)} \rightarrow 2\ H_2O_{(l)} + BaC_2O_{4(s)}$