Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Chemical Reactions**

1. Complete and balance the following molecular equations (include phases). Write molecular, total (or complete) and net ionic equations.

**Example**

Molecular equation \_\_K2S(aq) + CoCl2(aq) 🡪 2 KCl(aq) + CoS(s)\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_2 K++ S2– + Co2+ + 2 Cl–\_🡪 2 K+ + 2 Cl– + CoS(s)

Net ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_ S2– + Co2+ \_🡪\_ CoS(s)

1. Chlorine gas bubbled through a lithium iodide solution forms a solution of Iodine (s) and what (aq)?

Molecular equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Aluminum reacts with a solution of lead (II) nitrate to form solid lead an a solution of ?

Molecular equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic equation \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Lime water (a solution of calcium hydroxide) and hydrochloric acid react to make water and what (aq)?

Molecular equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Solid zinc metal is placed in a solution of acetic acid forming hydrogen gas and a solution of what?

Molecular equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic equation \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Solutions of cobalt (III) nitrate and hydrosulfuric acid form solid cobalt (III) sulfide and what?

Molecular equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Solutions of lead (II) nitrate and potassium sulfide will form a lead (II) sulfide precipitate and what (aq)?

Molecular equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Copper wire in a solution of silver nitrate will form a copper (II) nitrate solution and what precipitate?

Molecular equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic equation \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Solid manganese (IV) oxide is acted upon by hydrochloric acid making chlorine (g), water, and a solution of manganese (II) chloride.

Molecular equation \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Ionic equation \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Net ionic equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Complete and **balance** the following molecular equations (include phases). Label them as SYN = synthesis reaction, DEC=decomposition, SR=single replacement, DR= double replacement, and C=combustion. One single replacement reaction will not take place.

\_\_\_\_\_\_\_ 1. Mg(s) + O2(g)  🡪

\_\_\_\_\_\_\_ 2. C12H22O11(s) + O2(g) 🡪

\_\_\_\_\_\_\_ 3. CaCO3(s) + Heat 🡪

\_\_\_\_\_\_\_ 4. (produces a precipitate) KI(aq) + Pb(NO3)2(aq) 🡪

\_\_\_\_\_\_\_\_\_ 5. H2O(l) + electricity  🡪

\_\_\_\_\_\_\_ 6. Fe(s) + CuSO4(aq)  🡪 (Fe → Fe+3)

\_\_\_\_\_\_\_ 7. C4H10(g) + O2(g) 🡪

\_\_\_\_\_\_\_ 8. Na(s) + Cl2(g)🡪 (s)

\_\_\_\_\_\_\_ 9. Zn(s) + MgSO4(aq) 🡪

\_\_\_\_\_\_\_ 10. K(s) + Br2(l)  🡪 (s)

**Chemical Reactions KEY**

Part 1

1. Molecular Cl2(g) + 2LiI(aq) 🡪 I2(s) + 2LiCl(aq)

2. Molecular 2Al(s) + 3Pb(NO3)2 (aq) 🡪 3Pb(s) + 2Al(NO3)3 (aq)

3. Molecular Ca(OH)2 (aq) + 2HCl (aq) 🡪 2H2O(*l*) + CaCl2 (aq)

4. Molecular Zn(s) + 2HCH3COO (aq) 🡪 H2 (g) + Zn(CH3COO)2 (aq)

5. Molecular 2Co(NO3)3(aq) + 3H2S(aq) 🡪 Co2S3(s) + 6HNO3(aq)

6. Molecular Pb(NO3)2 (aq) + K2S (aq) 🡪 PbS (s) + 2KNO3(aq)

7. Molecular Cu(s) + 2AgNO3 (aq) 🡪 Cu(NO3)2 (aq) + 2Ag(s)

8. Molecular MnO2(s) + 4HCl (aq) 🡪 Cl2 (g) + 2H2O(*l*) + MnCl2 (aq)

Part 2

C 1. Mg (s) + O2 (g) 🡪 MgO (s)

DEC 3. CaCO3(s) + Heat 🡪 CaO (s) + CO2 (g)

DEC 5. 2H2O (*l*) + electricity 🡪 2H2 (g) + O2 (g)

C 7. 2C4H10 (g) + 13O2 (g) 🡪 8CO2 (g) + 10H2O (*l*)

n/a 9. Zn(s) + MgSO4(aq) 🡪 No Reaction