

Be able to answer the following:

1. What are the four state symbols and what do they indicate?
2. What are some indications of the occurrence of a chemical reaction?
3. What do the coefficients in a chemical equation represent?
4. What are the seven elements that exist as diatomic molecules when by themselves?
5. What are oxidation and reduction? Be able to identify the element that is oxidized and the element that is reduced in a chemical reaction and what their products are.
6. What is an aqueous solution?
7. What is a precipitate?

Balance each of the following reactions and indicate the reaction type in the blank at right.

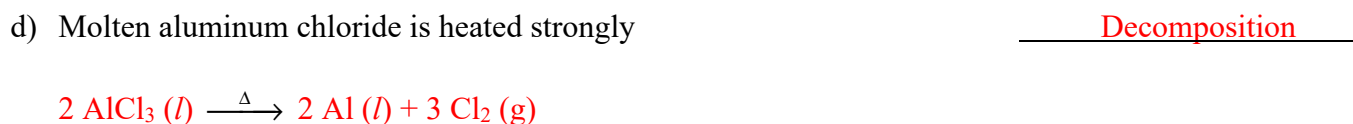
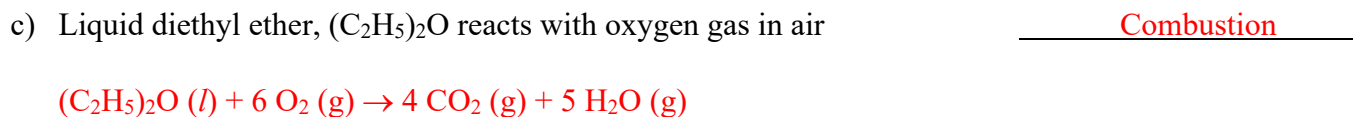
- | | Reaction Type |
|---|-----------------------------|
| 1. $\underline{\quad}$ Li ₂ O (s) + $\underline{\quad}$ H ₂ O (l) \longrightarrow $\underline{2}$ LiOH (aq) | <u>Synthesis</u> |
| 2. $\underline{\quad}$ Ca(ClO ₃) ₂ (s) $\xrightarrow{\Delta}$ $\underline{\quad}$ CaCl ₂ (s) + $\underline{3}$ O ₂ (g) | <u>Decomposition</u> |
| 3. $\underline{2}$ NaBr (aq) + $\underline{\quad}$ F ₂ (g) \longrightarrow $\underline{2}$ NaF (aq) + $\underline{\quad}$ Br ₂ (l) | <u>Single Replacement</u> |
| 4. $\underline{\quad}$ C ₅ H ₁₂ (l) + $\underline{8}$ O ₂ (g) \longrightarrow $\underline{5}$ CO ₂ (g) + $\underline{6}$ H ₂ O (g) | <u>Combustion</u> |
| 5. $\underline{\quad}$ Au ₂ S ₃ (aq) + $\underline{3}$ H ₂ (g) \longrightarrow $\underline{2}$ Au (s) + $\underline{3}$ H ₂ S (g) | <u>Single Replacement</u> |
| 6. $\underline{4}$ Fe (s) + $\underline{3}$ O ₂ (g) \longrightarrow $\underline{2}$ Fe ₂ O ₃ (s) | <u>Synthesis/Combustion</u> |

Write and balance the following reactions and indicate their type(s):

- | Reaction | Type(s) |
|---|-----------------------------|
| 7. Aqueous barium chloride mixes with aqueous aluminum sulfate to form solid barium sulfate and aqueous aluminum chloride.
$3 \text{BaCl}_2 (\text{aq}) + \text{Al}_2(\text{SO}_4)_3 (\text{aq}) \longrightarrow 3 \text{BaSO}_4 (\text{s}) + 2 \text{AlCl}_3 (\text{aq})$ | <u>Double Replacement</u> |
| 8. Solid antimony reacts in oxygen gas to form solid tetraantimony hexoxide.
$4 \text{Sb} (\text{s}) + 3 \text{O}_2 (\text{g}) \longrightarrow \text{Sb}_4\text{O}_6 (\text{s})$ | <u>Synthesis/Combustion</u> |
| 9. Solid potassium chlorate is heated in a test tube and produces solid potassium chloride and oxygen gas.
$2 \text{KClO}_3 (\text{s}) \xrightarrow{\Delta} 2 \text{KCl} (\text{s}) + 3 \text{O}_2 (\text{g})$ | <u>Decomposition</u> |
| 10. Liquid isopropanol (C ₃ H ₇ OH) reacts with oxygen gas to form gaseous carbon dioxide and water vapor.
$2 \text{C}_3\text{H}_7\text{OH} (\text{l}) + 9 \text{O}_2 (\text{g}) \longrightarrow 6 \text{CO}_2 (\text{g}) + 8 \text{H}_2\text{O} (\text{g})$ | <u>Combustion</u> |

11. Complete the following reactions by determining the products (first determine the reactant formulas, if needed), then balance the equations and indicate the reaction type:

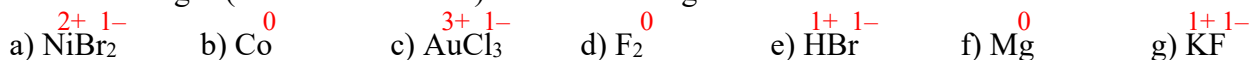
Reaction Type



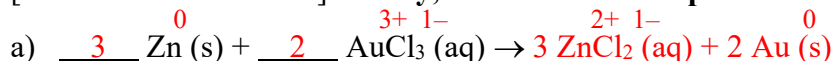
12. Label these changes as either oxidation or reduction:



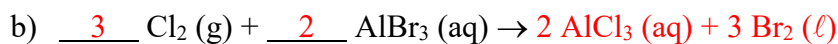
13. Put in all charges (oxidation numbers) in the following substances.



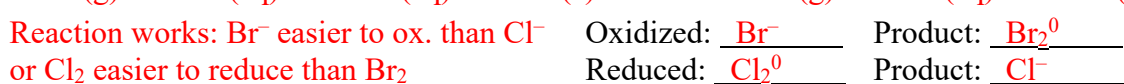
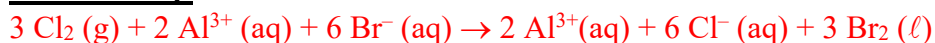
14. Complete these reactions, put in all oxidation numbers and then write the net ionic equation. Then indicate which substance is being oxidized, which is being reduced, and what their products are. [Remember LEO-GER!] **Finally, use Chart H to explain if the reaction will occur.**



Net Ionic Eq:

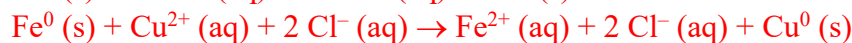
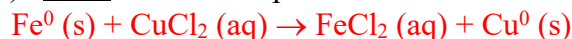


Net Ionic Eq:

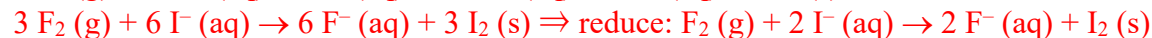
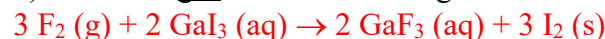


15. For these reactions, first determine the reactant formulas, then complete & balance the reactions, determine the net ionic equation and whether the reaction will occur. Explain by referring to Chart H.

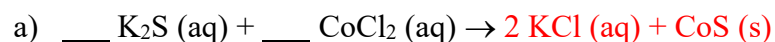
a) Solid iron wire is placed into a solution of copper(II) chloride (Fe will form Fe²⁺ in the products).



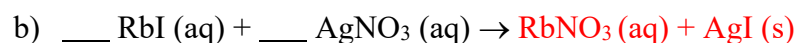
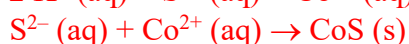
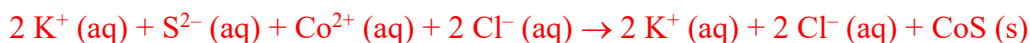
b) Fluorine gas is bubbled through a solution of gallium(III) iodide.



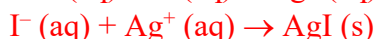
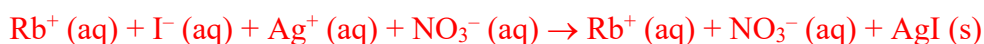
16. DETERMINE the products and write the BALANCED EQUATION for each for each of these double-replacement reactions. Determine the solubilities of the products and explain your reasoning. Then write the Net Ionic Equations



K^+ always soluble; No rules for Co^{2+} or S^{2-} so insoluble

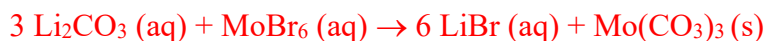


Rb^+ and NO_3^- always soluble; I^- insoluble with Ag^+

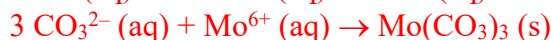
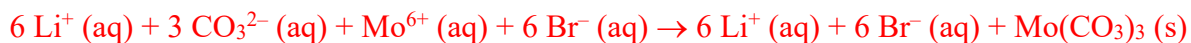


For c & d, first determine the reactant formulas, then complete the reactions as above.

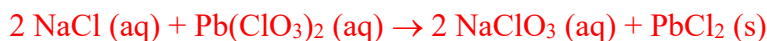
c) Lithium carbonate solution reacts with molybdenum(VI) bromide solution.



Li^+ always soluble; no rules for Mo^{6+} or CO_3^{2-} so insoluble



d) Sodium chloride solution reacts with lead(II) chlorate solution.



Na^+ and ClO_3^- always soluble; Cl^- insoluble with Pb^{2+}

