AP CHEMISTRY

TOPIC 1: CHEMICAL FOUNDATIONS, PART F

Day 7:

- Chemical Equations

Homework problems:

1) a) What scientific principle or law is used in the process of balancing chemical equations?

b) In balancing equations, why shouldn't subscripts in chemical formulas be changed? Explain

c) What are the symbols used to represent gases, liquids, solids, and aqueous equations?

2) Balance the following equations:

a) _____ $CO_{(g)}$ + _____ $O_{2\,(g)}$ → _____ $CO_{2\,(g)}$

b) _____ $N_2O_{5\,(g)}$ + _____ $H_2O_{(l)}$ → _____ $HNO_{3\,(aq)}$

c) _____ $CH_{4\,(g)}$ + _____ $Cl_{2\,(g)}$ → _____ $CCl_{4\,(l)}$ + _____ $HCl_{(g)}$

d) _____ $Al_4C_{3\,(s)}$ + _____ $H_2O_{(l)}$ → _____ $Al(OH)_{3\,(s)}$ + _____ $CH_{4\,(g)}$

e) _____ $C_5H_{10}O_{2\,(l)}$ + _____ $O_{2\,(g)}$ → _____ $CO_{2\,(g)}$ + _____ $H_2O_{(l)}$

f) _____ $Fe(OH)_{3\,(s)}$ + _____ $H_2SO_{4\,(aq)}$ → _____ $Fe_2(SO_4)_{3\,(aq)}$ + _____ $H_2O_{(l)}$

g) _____ $Mg_3N_{2\,(s)}$ + _____ $H_2SO_{4\,(aq)}$ → _____ $MgSO_{4\,(aq)}$ + _____ $(NH_4)_2SO_{4\,(aq)}$

h) _____ $Li_{(s)}$ + _____ $N_{2\,(aq)}$ → _____ $Li_2N_{(s)}$

i) _____ $NH_4NO_{3\,(s)}$ → _____ $N_{2\,(g)}$ + _____ $O_{2\,(g)}$ + _____ $H_2O_{(g)}$

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3) Write a balanced chemical equation that describes each of the following:

a) Iron metal reacts with oxygen to form rust, iron(III) oxide.

b) Calcium metal reacts with water to produce aqueous calcium hydroxide and hydrogen gas.

c) Aqueous barium hydroxide reacts with aqueous sulfuric acid to produce solid barium sulfate and water.

d) Glucose ($C_6H_{12}O_6$) reacts with oxygen gas to produce carbon dioxide and water vapor.

e) Solid iron(III) sulfide reacts with gaseous hydrogen chloride to form solid iron(III) chloride and hydrogen sulfide gas.

f) Carbon disulfide liquid reacts with ammonia gas (NH_3) to produce hydrogen sulfide gas and solid ammonium thiocyanate (NH_4SCN).

g) Solid calcium carbide (CaC_2) reacts with water to form an aqueous solution of calcium hydroxide and acetylene gas (C_2H_2).

h) When solid potassium chlorate is heated, it decomposes to form solid potassium chloride and oxygen gas.

i) Solid zinc metal reacts with sulfuric acid to form hydrogen gas and an aqueous solution of zinc sulfate.

j) When liquid phosphorus trichloride is added to water, it reacts to form aqueous phosphor**ous** acid (remember rules from last week on naming acids) and aqueous hydrochloric acid.

k) When hydrogen sulfide gas is passed over solid hot iron(III) hydroxide, the resultant reaction produces solid iron(III) sulfide and gaseous water.