Pre-Test Chemistry Practice:

**1. Write the chemical formula for the following compounds:**

 a. iron(II) nitrite b. aluminum carbonate c. disilicon hexahydride

 d. nitric acid e. calcium hydroxide f. hydroiodic acid

 g. sulphurous acid h. carbonic acid i. lead(IV) oxide

**2. Count the number of atoms or poly atomic ions of each element in the following. The first three are done for you as examples:**

 a. magnesium fluoride \_\_\_ Mg \_\_\_ F

 b. Pb(CrO4)2 \_\_\_ Pb \_\_\_ CrO4

c. carbon dioxide \_\_\_ C \_\_\_ O

 d. H2 \_\_\_ H

 e. Ba(OH)2 \_\_\_ Ba \_\_\_ OH

 f. sodium nitrite \_\_\_ Na \_\_\_ NO2

 g. chromic acid \_\_\_ H \_\_\_ CrO4

 h. nitrous acid \_\_\_ \_\_ \_\_\_ \_\_

 i. iron(III) hydroxide \_\_\_ \_\_ \_\_\_ \_\_

**3. Count the number of atoms or poly atomic ions in each of the following collections of atoms:**

 a. 2 molecules of hydrochloric acid \_\_\_ H \_\_\_ Cl

 b. 4 molecules of acetic acid \_\_\_ H \_\_\_ CH3COO

 c. 3 molecules of O2 and 2 molecules of CaCO3

 \_\_\_ O \_\_\_ Ca \_\_\_ C

 d. 2 molecules of potassium hydroxide and 3 molecules of sodium nitride

 \_\_\_ Na \_\_\_ OH \_\_\_ N \_\_\_ K

 e. 10 molecules of nickel(II) chlorite and 50 molecules of hydrogen gas

 \_\_\_ H \_\_\_ Ni \_\_\_ ClO2

 f. 5 molecules of copper(I) carbonate and 3 molecules of ammonium oxide

 \_\_\_ Cu \_\_\_ O \_\_\_ N \_\_\_ H \_\_\_ C

**Balance the following chemical equations. For some you will need to predict the products first. Classify each reaction.**

1. \_\_\_\_ KClO3 → \_\_\_\_ KCl + \_\_\_\_ O2 TYPE: \_\_\_\_\_
2. \_\_\_\_ K3PO4 + \_\_\_\_ HCl → \_\_\_\_ KCl + \_\_\_\_ H3PO4 TYPE: \_\_\_\_\_
3. \_\_\_\_ H2SO4 + \_\_\_\_ Ca(OH)2 → \_\_\_\_ CaSO4 + \_\_\_\_ H2O TYPE: \_\_\_\_\_
4. \_\_\_\_ H2SO3 + \_\_\_\_ Cu(OH)2 → TYPE: \_\_\_\_\_

**Write each as a chemical equation then BALANCE AND CLASSIFY!**

1. Nitrogen plus hydrogen produce ammonia. TYPE: \_\_\_\_\_
2. Sodium oxide combines with water to form sodium hydroxide. TYPE: \_\_\_\_\_
3. Hydrochloric acid and calcium hydroxide yield water and calcium chloride. TYPE: \_\_\_\_\_

1. Carbonic acid and aluminum hydroxide yield aluminum carbonate and water. TYPE: \_\_\_\_\_
2. Sodium hydroxide and nitrous acid react to form… TYPE: \_\_\_\_\_
3. Tetracarbon decahydride and oxygen yield… TYPE: \_\_\_\_\_
4. Nickel(III) oxide and potassium nitride react to form nickel(III) nitride and… TYPE: \_\_\_\_\_
5. Trinitrogen monoxide breaks down into nitrogen and oxygen. TYPE: \_\_\_\_\_
6. Sulfuric acid is neutralized by lithium hydroxide. TYPE: \_\_\_\_\_
7. Zinc hydroxide is neutralized by sulfurous acid. TYPE: \_\_\_\_\_

11. Acetic acid and vanadium(V) hydroxide yield… TYPE: \_\_\_\_\_

For each of the following state whether the described change will INCREASE, DECREASES or have NO EFFECT on the reaction rate

1. A piece of copper is placed into 50mL of weak HCl. 20 mL more of the HCl is then added. \_\_\_\_\_\_\_\_\_\_\_\_
2. A piece of copper is placed into 50mL of weak HCl. 20mL of strong HCl is then added. \_\_\_\_\_\_\_\_\_\_\_\_
3. A piece of copper is placed into 50mL of weak HCl. The coper is then shaved into small pieces.

 \_\_\_\_\_\_\_\_\_\_\_\_

1. A piece of copper is placed into 50mL of weak HCl. The beaker is then moved into a refrigerator.

 \_\_\_\_\_\_\_\_\_\_\_\_

1. A piece of fat is placed into a container of digestive fluid. A lipase enzyme is then added. \_\_\_\_\_\_\_\_\_\_\_\_
2. 6. A solution of sodium carbonate is poured into a solution of beryllium fluoride. The container is then heated over a Bunsen burner. \_\_\_\_\_\_\_\_\_\_\_\_

7. A piece of aluminum is placed into strong HCl. Water is then added. \_\_\_\_\_\_\_\_\_\_\_\_

8. A piece of aluminum is placed into strong H2SO4. NaOH is then added \_\_\_\_\_\_\_\_\_\_\_\_

Use the diagram below to answer the following questions:

Blue

Yellow

Colombo Blue (CB)

Red

Blue

 Red Tillium (RT)

 Bimini Yellow (BY)

Yellow

Blue

Yellow

 Chyamalystrophol (Chsp)

Red

 Fluffmustard Red (FR)

Green

Red

 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. What colour is Colombo blue at a pH of 7?
2. What colour is Bimini Yellow at a pH of 13.3?
3. What colour is Fluffmustard Red at a pH of 3?
4. What colour is Chyamalystrophol at a pH of 4?
5. An unknown solution is blue in CB, red in RT and red in FR. What is the pH range?
6. An unknown is orange in Chsp. What colour will it be in FR?

**Answer the following questions about energy in reactions. Only one choice for each question**

1. A reaction in which energy is transferred to the reactants, usually as heat from the

surroundings is

 a. endothermic b. thermoneutral c. exothermic

 d. all of these e. none of these

2. A reaction in which the chemical bonds of the products contain less energy than the chemical bonds of the reactants is:

 a. endothermic b. thermoneutral c. exothermic

 d. all of these e. none of these

3. When a chemical reaction occurs, atoms are never \_\_\_\_\_\_\_\_\_.

 a. ionized b. rearranged c. vaporized (turned to gas)

 d. destroyed e. moved

4. Which of the following is an example of an endothermic process?

 a. Dynamite explodes. b. Rain freezes and becomes snow.

 c. Ice melts in the sun. d. Wood burns in a fire.

5. In an endothermic reaction, energy is transferred from

 a. the reactants to the surroundings b. one reactant to another

 c. the surroundings to the reactants d. none of these

6. As a result of the reaction of a small amount of material placed in water, there is a large increase in the temperature of the water. This reaction is

 a. endothermic b. thermoneutral

 c. exothermic d. none of these

7. The minimum amount of energy needed to start a chemical reaction is

a. temperature b. heat of vaporization

 c. activation energy d. heat of fusion

8. The demonstration in class of lycopodium powder dropped onto a candle flame showed the importance of which of the following on reaction rate?

 a. temperature b. surface area

 c. catalysts d. concentration

Pre-Test Chemistry Practice KEY:

**1. Write the chemical formula for the following compounds:**

 a. Fe(NO2)2 b. Al2(CO3)3 c. Si2H6

 d. HNO3 e. Ca(OH)2 f. HI

 g. H2SO3 h. H2CO3 i. PbO2

**2. Count the number of atoms or poly atomic ions of each element in the following. The first three are done for you as examples:**

 a. magnesium fluoride 1 Mg 2 F

 b. Pb(CrO4)2 1 Pb 2 CrO4

c. carbon dioxide 1 C 2 O

 d. H2 2 H

 e. Ba(OH)2 1 Ba 2 OH

 f. sodium nitrite 1 Na 1 NO2

 g. chromic acid 2 H 1 CrO4

 h. nitrous acid 1 H 1 NO3

 i. iron(III) hydroxide 1 Fe 3 OH

**3. Count the number of atoms or poly atomic ions in each of the following collections of atoms:**

 a. 2 molecules of hydrochloric acid 2 H 2 Cl

 b. 4 molecules of acetic acid 4 H 4 CH3COO

 c. 3 molecules of O2 and 2 molecules of CaCO3

 12 O 2 Ca 2 C

 d. 2 molecules of potassium hydroxide and 3 molecules of sodium nitride

 9 Na 2 OH 3 N 2 K

 e. 10 molecules of nickel(II) chlorite and 50 molecules of hydrogen gas

 100 H 10 Ni 20 ClO2

 f. 5 molecules of copper(I) carbonate and 3 molecules of ammonium oxide

 10 Cu 18 O 6 N 24 H 5 C

**Balance the following chemical equations. For some you will need to predict the products first. Classify each reaction.**

1. 2 KClO3 → 2 KCl + 3 O2 TYPE: D
2. 1 K3PO4 + 3 HCl → 3 KCl + 1 H3PO4 TYPE: DR
3. 1 H2SO4 + 1 Ca(OH)2 → 1CaSO4 + 2H2O TYPE: N
4. 1 H2SO3 + 1 Cu(OH)2 → 1 CuSO3 + 2 H2O TYPE: N

**Write each as a chemical equation then BALANCE AND CLASSIFY!**

1. 1 N2 + 3 H2 → 2 NH3 TYPE: S
2. 1 Na2O + 1 H2O → 2 NaOH TYPE: S
3. 2 HCl + 1 Ca(OH)2 → 2 H2O + 1 CaCl2 TYPE: N

1. 3 H2CO3 + 2 Al(OH)3 → 1 Al2(CO3)3 + 6 H2O TYPE: N
2. Sodium hydroxide and nitrous acid react to form **WATER and SODIUM NITRITE** TYPE: N

 1 NaOH + 1 HNO2 → 1 H2O + 1 NaNO2

1. Tetracarbon decahydride and oxygen yield **CARBON DIOXIDE and WATER** TYPE: C

 2 C4H10 + 13 O2 → 8 CO2 + 10 H2O

1. Nickel(III) oxide and potassium nitride react to form nickel(III) nitride and **POTASSIUM OXIDE** TYPE: DR

 1 Ni2O3 + 2 K3N → 2 NiN + 3 K2O

1. Trinitrogen monoxide breaks down into nitrogen and oxygen. TYPE: D

 2 N3O → 3 N2 + 1 O2

1. Sulfuric acid is neutralized by lithium hydroxide. TYPE: N

 1 H2SO4 +2 LiOH →2 H2O + 1 Li2SO4

1. Zinc hydroxide is neutralized by sulfurous acid. TYPE: N

 1 Zn(OH)2 + 1 H2SO3 → 2 H2O + 1 ZnSO3

11. Acetic acid and vanadium(V) hydroxide yield **WATER and VANADIUM(V) ACETATE** TYPE: N

 5 HCH3COO + 1 V(OH)5 → 1 V(CH3COO)5 + 5 H2O

**For each of the following state whether the described change will INCREASE, DECREASES or have NO EFFECT on the reaction rate**

1. A piece of copper is placed into 50mL of weak HCl. 20 mL more of the HCl is then added. **NE**
2. A piece of copper is placed into 50mL of weak HCl. 20mL of strong HCl is then added. I
3. A piece of copper is placed into 50mL of weak HCl. The coper is then shaved into small pieces. I

1. A piece of copper is placed into 50mL of weak HCl. The beaker is then moved into a refrigerator. D
2. A piece of fat is placed into a container of digestive fluid. A lipase enzyme is then added. I
3. 6. A solution of sodium carbonate is poured into a solution of beryllium fluoride. The container is then heated over a Bunsen burner. I

7. A piece of aluminum is placed into strong HCl. Water is then added. D

8. A piece of aluminum is placed into strong H2SO4. NaOH is then added D

Use the diagram below to answer the following questions:

Blue

Yellow

Colombo Blue (CB)

Red

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 Red Tillium (RT)

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 Chyamalystrophol (Chsp)

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 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. What colour is Colombo blue at a pH of 7?  **BLUE**
2. What colour is Bimini Yellow at a pH of 13.3? **YELLOW**
3. What colour is Fluffmustard Red at a pH of 3? **RED**
4. What colour is Chyamalystrophol at a pH of 4? **ORANGE**
5. An unknown solution is blue in CB, red in RT and red in FR. What is the pH range? **2.7 - 6**
6. An unknown is orange in Chsp. What colour will it be in FR? **RED**

**Answer the following questions about energy in reactions. Only one choice for each question**

1. A reaction in which energy is transferred to the reactants, usually as heat from the

surroundings is

 **a. endothermic**

2. A reaction in which the chemical bonds of the products contain less energy than the chemical bonds of the reactants is:

 **c. exothermic**

3. When a chemical reaction occurs, atoms are never \_\_\_\_\_\_\_\_\_.

 **d. destroyed**

4. Which of the following is an example of an endothermic process?

 **c. Ice melts in the sun.**

5. In an endothermic reaction, energy is transferred from

 **c. the surroundings to the reactants**

6. As a result of the reaction of a small amount of material placed in water, there is a large increase in the temperature of the water. This reaction is

 **c. exothermic**

7. The minimum amount of energy needed to start a chemical reaction is

**c. activation energy**

8. The demonstration in class of lycopodium powder dropped onto a candle flame showed the importance of which of the following on reaction rate?

 **b. surface area**