**SNC 2D – Types of Reactions Lab**

Name: /21 TI /23 C

**Pre-Lab: /44 MARKS**

1. Research testing for gases. Include a description of the test for each of the gases below, and the result of the test. (1 mark each x 3 = 3 marks – C)

Hydrogen:

Oxygen:

Carbon Dioxide:

**Purpose:**

The purpose of this lab is to classify chemical reactions as synthesis, decomposition, single displacement, or double displacement.

**Hypotheses:**

*Read through the procedure on the next page. Based on the reactants, determine what reaction will occur and include an “if…then” statement.* (0.5 marks each x 6 = 3 marks – TI)

Part 1:

Part 2:

Part 3:

Part 4:

Part 5:

Part 6:

**Safety:**

* As with all chemistry labs, hair should be tied back, no dangling jewelry or scarves, safety goggles on at all times until told to remove.
* Hydrochloric acid, sodium carbonate, copper (II) sulfate, and copper (II) chloride are skin irritants or corrosive. Avoid touching all reactants and products.
* Sodium carbonate, copper (II) sulfate, hydrogen peroxide and copper (II) chloride are toxic.
* Magnesium metal is flammable.

**Materials:**

* 10-mL graduated cylinder
* Test tubes
* Test tube rack
* 250-mL beaker
* Bunsen burner
* Tongs
* Scoopula
* Wooden splints
* Press-and-seal wrap
* 1 M hydrochloric acid solution
* Zinc pieces
* Hydrogen peroxide, H2O2 (aq)
* Manganese dioxide powder
* Sodium bicarbonate powder
* Copper (II) sulfate solution
* Sodium carbonate solution
* Magnesium metal ribbon
* Copper (II) chloride solution

**Procedure:**

Part 1 – Burning Magnesium (teacher demo)

1. Polish a piece of magnesium ribbon with steel wool
2. Use the Bunsen burner to ignite the magnesium ribbon, while holding one end of the ribbon with tongs over the flame.
3. Record your observations during ignition and the resulting product.

Part 2 – Zinc and Hydrochloric Acid

1. Using a graduated cylinder, measure 5 mL of hydrochloric acid and transfer it into a test tube.
2. Drop a piece of zinc metal into the test tube.
3. While the reaction is still occurring, do a “splint test” to determine the identity of the gas produced. Cover the opening of the test tube with “press and seal” wrap and agitate side to side for about 2 minutes to collect the gas. Bring a burning splint to the mouth of the test tube and record the result.
4. Record your observations of the chemical reaction.

Part 3 – Copper (II) Sulfate and Sodium Carbonate

1. Using a graduated cylinder, measure 5 mL of copper (II) sulfate and transfer it into a test tube.
2. Using a graduated cylinder (rinse first), measure 3 mL of sodium carbonate and transfer it to another test tube.
3. Pour one test tube into the other.
4. Record your observations.

Part 4 – Iron and Copper (II) Chloride

1. Using a graduated cylinder, measure 10 mL of copper (II) chloride and transfer it into a test tube.
2. Drop a piece of iron (steel wool, gently rolled into a ball) into the test tube.
3. Gently agitate the test tube side to side, noting observations over a 2-minute period.

Part 5 – Hydrogen Peroxide

1. Using a graduated cylinder, measure 5 mL of hydrogen peroxide and transfer it into a test tube.
2. Add a small scoop of manganese dioxide to the test tube*. \*\*Note that manganese dioxide is not considered a reactant – it is simply a catalyst to speed the reaction along\*\**
3. While the reaction is still occurring (within the first 30 seconds), do a “splint test” to determine the identity of the gas produced. Place a glowing splint into the mouth of the test tube and record the result.
4. Record your observations of the chemical reaction.

Part 6 – Sodium Bicarbonate (baking soda) and Hydrochloric Acid

1. Using a graduated cylinder, measure 5 mL of hydrochloric acid and pour it into a test tube.
2. Add a small scoop of sodium bicarbonate to the test tube.
3. While the reaction is still occurring (within the first 30 seconds), do a “splint test” to determine the identity of the gas produced. Using “press and seal” wrap, cover the opening of the test tube to collect the gas. Place a burning splint into the mouth of the test tube and record the result.
4. Record your observations of the chemical reaction.

**Observations:** *2 details for each reactant (0.5 marks x 10 = 5 marks), 2 chemical changes to products (2 marks each x 6 = 12 marks) and gas test results where necessary (1 mark each x 3 = 3 marks) (20 TOTAL – C)*

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| --- | --- | --- |
| **Procedure** | **Reactants** | **Products** |
| Part 1Burning Magnesium /2.5 |  |  |
| Part 2Zinc + Hydrochloric Acid /4 |  |  |
|  |
| Part 3Copper (II) Sulfate + Sodium Carbonate /3 |  |  |
|  |
| Part 4Iron + Copper (II) Chloride /3 |  |  |
|  |
| Part 5Hydrogen Peroxide /3.5 |  |  |
| Part 6Sodium Bicarbonate + Hydrochloric Acid /4 |  |  |
|  |

**Discussion Questions:**

For each part:

* 1. Indicate the **TYPE** of reaction (0.5 marks each x 6 = 3 marks TI)
	2. Write the **WORD EQUATION** (0.5 marks each x 6 = 3 marks TI)
	3. Write the **BALANCED CHEMICAL EQUATION** (2 marks each x 6 = 12 marks TI)

|  |  |
| --- | --- |
| **Procedure** | **Data** |
| Part 1 | Type: |
| Word: |
| Balanced: |
| Part 2 | Type: |
| Word: |
| Balanced: |
| Part 3 | Type: |
| Word: |
| Balanced: |
| Part 4 | Type: |
| Word: |
| Balanced: |
| Part 5 | Type: |
| Word: |
| Balanced: |
| Part 6 | Type: |
| Word: |
| Balanced: |