Synthesis of Urea

Name_____

SID_____

Technique____/5 Report_____/50 Total_____/55

Section : Introduction

Statement of Purpose. Write a succinct statement describing why the experiment was performed. (5 pts)

Reaction Equation. Write a balanced reaction equation. (5pts)

Section II: Reaction Methods

Experimental Procedure: (10 pts)

A ____ mL beaker containing _____ mL of H_2O was placed on a hot plate, and the hot plate was turned on to high. An evaporating dish was set on top of the beaker. A mixture of ___ g of Potassium cyanate, ____ g of ammonium sulfate, and ____ mL of H_2O were added to the evaporating dish. The mixture was stirred in the evaporating dish until all of the solid is dissolved, then heating was continued until the water in the evaporating dish has evaporated.

Isopropanol (____ mL) was added to the evaporating dish with continued heating. Once the isopropanol began to boil, the solid was collected on a Buchner funnel, and the solid was washed with another ___ mL of isopropanol.

The clear filtrate solution was transered into a clean, dry evaporating dish and the evaporating dish was placed back on the beaker containing the boiling water. The filter

flask was washed with ____ mL of isopropanol and this liquid was poured into the evaporating dish. The solution ion the evaporating dish was evaporated until it was dry.

Tests:
A mixture of ____ g of potassium cyanate, ____ g ammonium sulfate, and ____ mL of water was stirred until all of the solid was dissolves, then it was divided between two test tubes labeled test tube **A** and test tube **B**. HCl (___ mL, 3 M) **dropwise** to test tube **A** and gently swirl the test tube to mix the contents. Then, in a fume hood, NaOH (___ mL, 3 M) was added **dropwise** to test tube **B**. Using a pair of tweezers, a piece of *wet* litmus paper was used to determine the pH of the vapor above the solution in test tube **B**.

A mixture of ____ g of the product in ____ mL of H_2O was divided into two test tubes labeled test tube **C** and test tube **D**. HCl (___ mL, 3 M) was added to test tube **C**. Then, in a fume hood, NaOH (__ mL, 3 M) was added to test tube **D**. A piece of *wet* litmus paper was used to test the pH of the vapor above the solution in test tube **D**.

Observations. (10 pts) In addition to general observation made while running the reaction, describe any changes you made from the above procedure. Also describe the crystals (color, shape, etc). Describe the observations made in your tests of the various solutions.

Section III: Analysis (5 pts)

Melting point:

Mixed melting point:

Calculate your percent yield:

Questions: (3 pts each)

1) Why does a mixed melting point tell us if two compounds are the same or different?

2) What might be the solid that was filtered away from the solution of product (the solid not kept)?

3) Is the product isolated after heating different than the compounds that were originally mixed together? How do you know?

4) What was the purpose of using the Buchner funnel filtration?

5) Did Wöhler make urea or did he simply isolate an inorganic salt?