**Reaction Calculation**

**Stoichiometry Project**

As part of our stoichiometry unit, you are going to investigate the production and use of a particular chemical. The chemical of interest this unit is sodium carbonate (Na2CO3). The other common name for this compound is soda ash. From the mid 1800’s to now, sodium carbonate has been a major manufacturing product of some chemical industries. In the past, sodium carbonate was produced by either the LeBlanc process or the Solvay process. The Solvay process is still in use today.

As part of the research, you are to answer the following questions concerning sodium carbonate production. Your research project will include a reference section and it is expected that you will examine and use a minimum of 3 references (internet sites are appropriate here). The information you collect will be placed in a “mini” report attached with the experimental component. It is expected that you will use a proper referencing technique when writing the report. Your report must be in full paragraph form - and will likely be a minimum of 500 words or so excluding diagrams and reactions. Where diagrams and reactions are presented as part of the discussion, these should be referenced appropriately and referred to in the text of the explanation. The format of the report should be as follows:

 Title Page

 Body of Paper (do not number questions – answer in paragraph form)

 Reference List

 (diagrams can be imbedded in text or added as appendums

 as long as they are referred to in text body)

The due date for this project is ­­­­-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Research Questions for Project**:

1. Outline the Solvay and LeBlanc Process for the production of sodium carbonate. Include in your explanation chemical reactions involved, starting materials, reaction conditions and equipment involved.

2. Explain why the Solvay process made the LeBlanc process obsolete - what were

 the advantages of the new process Solvay invented over the older process.

3. Why is sodium carbonate such an important chemical - what are some of the potential uses of this chemical - products it is used to form - processes it is involved in .

4. The Solvay process involves some “recyclable” chemicals. What is meant by this term? What are the chemicals that are considered “recyclable” and how is this an advantage for the chemical industry?

5. Does sodium carbonate occur in natural mineral deposits? Please explain - Currently what is the major source of sodium carbonate in the United States.

6. In terms of environmental pollution, do either of these two processes pose any significant threats to environment - (in terms of air, water and land pollution) - If so, please explain.

7. If you had 10 billion kg of the soda ash being produced, how much sodium bicarbonate would you need to produce that much during the fourth reaction and how much carbon dioxide and water would you be producing as well? (Show all your calculations)