NAME _____ PREF ____ SECTION SC_____ DATE _____

EXPERIMENT 27: REACTIONS THAT GO TO COMPLETION

Equipment: Bunsen burner, 1-2 test tubes
Materials: 11-12mL 3M HCl, 1-2mL Na_2CO_3, piece of $Zn_{(s)}$, matches, 1 candle

In this experiment you will discover the conditions under which a reaction cannot reverse itself.

A. Add a few drops of 3M HCl to a pinch of Na_2CO_3 in a test tube.

1. What evidence is there of a reaction? _____

2. Why can't this reaction reverse itself under the present experimental conditions? _____

_____

B. Add approximately 10 mL of 3M HCl to a small piece of Zn in a test tube.

1. What evidence is there of a reaction? _____

2. Why can't this reaction reverse itself under the present experimental conditions? _____

_____

C. Light and observe a candle and a Bunsen burner. Methane, the principal component of natural gas is CH_4. Candle wax is $C_{20}H_{42}$. 1. Write equations for the burning of each hydrocarbon. _____

_____

2. Why can't these reverse themselves under the present experimental conditions? _____

_____

D. Pour approximately 10 mL 0.1% $KMnO_4$ solution into a test tube. Add several drops of dilute sulfuric acid to acidify the solution. Add 10 mL saturated oxalic acid solution, stir gently to mix, then use your test tube holder to heat the test tube gently in a small blue flame.

1. What evidence is there of a reaction? _____

2. Why can't this reaction reverse itself under the present experimental conditions? _____

_____

E. **TEACHER DEMONSTRATION: [Caution: Must be done in fume hood.]** Cover the bottom of a 250 mL beaker with sugar to a depth of about 1/4". Carefully pour concentrated sulfuric acid into the beaker to just cover the sugar.

1. What evidence is there of a reaction? _____
2. Your teacher will give you the formula for sucrose and explain the dehydrating action of conc. sulfuric acid. Write an equation for the reaction.

_____

3. Why can't this reaction reverse itself under the present experimental conditions? _____

_____

SUMMARY QUESTIONS

1. What characteristics prevent all the reactions you observed from reversing themselves? _____

_____ _____

2. Use Kinetic Molecular Theory to explain why these prevent the reverse reactions. _____

_____

3. Suggest how you would alter the experimental conditions of one reaction to make it reversible.

