Exam #1

March 2, 2011

This is an open-book, open notes exam.

1. (20 points) The reactions shown would not proceed as indicated. Draw the actual products. You do $\underline{\text{not}}$ need to draw mechanisms.

a.
$$\begin{array}{c|c} NO_2 & Br_2 & NO_2 \\ \hline FeBr_3 & Pr_2 & Br_2 \\ \hline Br_2 & Br_2 & Br_3 \\ \hline Br_2 & Br_2 & Br_3 \\ \hline Br_2 & Br_3 & Br_4 \\ \hline Br_2 & Br_4 & Br_5 \\ \hline CN & CN & CN \\ \hline CN & CN & CN \\ \hline CO_2Et & CO_2Et \\ \hline CO_2CH_3 & NaH x 2 & CO_2CH_3 \\ \hline CO_2CH_3 & CO_2CH_3 &$$

2. (20 points) Circle the expected product. Explain your answer in detail. Stereochemistry is important!

$$CO_{2}Et$$

3. (20 points) Outline a synthesis of **A** using only starting materials that contribute three or fewer carbons to the final product.

4. (20 points) Deduce the structure of **C** and draw an arrow-pushing mechanism for its formation.

5. (20 points) Draw the letters on the product where they belong. Make a list of bonds formed and bonds broken, and draw the mechanism in detail.

