5-31-2019

Organic Chemistry I Drill (CHEM2210D) - Module 9 - Sample Problems

Candace M. Lawrence
Xavier University of Louisiana, clawren2@xula.edu

Follow this and additional works at: https://digitalcommons.xula.edu/doc_cm

Recommended Citation
Lawrence, Candace M., "Organic Chemistry I Drill (CHEM2210D) - Module 9 - Sample Problems" (2019). Course Modules. 36.
https://digitalcommons.xula.edu/doc_cm/36

Xavier University of Louisiana
XULA Digital Commons

This Organic Chemistry I is brought to you for free and open access by the Department of Chemistry at XULA Digital Commons. It has been accepted for inclusion in Course Modules by an authorized administrator of XULA Digital Commons. For more information, please contact ksiddell@xula.edu.
1. Predict the major product(s) of these reactions. Be sure to show stereochemistry explicitly, if applicable. (24 pts)

a. 

\[ \text{reaction} \]

b. 

\[ \text{reaction} \]

c. 

\[ \text{reaction} \]

d. 

\[ \text{reaction} \]

e. 

\[ \text{reaction} \]

f. 

\[ \text{reaction} \]

2. Propose a mechanism for this reaction. Be sure to show each step and intermediate explicitly if applicable, and show all necessary mechanistic arrows. (5 pts)

\[ \text{reaction} \]
3. Draw the 3 most important resonance forms for the bromonium ion intermediate formed here. Circle the most important structure, and indicate what makes it most important. (5 pts)

4. Complete this reaction sequence. (8 pts)

5. Propose syntheses, being sure to indicate all reagents required. (8 pts)

a.

b. 2 CH₃CO₂H from CH₃CH₂CHBrCH₃
1. (6 points) Write in the descriptions that best fit these reactions. Hint: this might help you for Question 2.

<table>
<thead>
<tr>
<th>Reagents</th>
<th>Addition type: write Markovnikov or Anti-Markovnikov</th>
<th>Relationship of the 2 groups added: Syn, Anti, or Does not matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hg(OAc)₂, H₂O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. NaBH₄</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-Cl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Br₂/H₂O</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. (21 points) Predict the major organic product(s) of these reactions. **If there are enantiomers, write both of them. Indicate stereochemistry with wedges and dashes as required.**

![Chemical structures]

3. (5 points) Fill in the boxes with the correct structure. Show stereochemistry, if needed.
4. (6 points) Propose a mechanism for this reaction. Be sure to show each step, intermediates, and show all necessary mechanistic arrows to receive full credit.

5. Propose syntheses of the desired products from the starting materials indicated, using any other reagents necessary.

(6 points)
1. Give the structure of the major organic product or products expected from the following reactions. Show the stereochemistry of the products if applicable. No reaction may be an appropriate answer in some cases. (5 points each)

a) \[
\text{[Structure]} \xrightarrow{\text{H}_2\text{SO}_4, \text{heat}} \xrightarrow{\text{HCl}}
\]

b) \[
\text{[Structure]} \xrightarrow{\text{H}_3\text{PO}_4} \xrightarrow{\text{NaH}} \xrightarrow{\text{CH}_3\text{Br}}
\]

c) \[
\text{[Structure]} \xrightarrow{2 \text{HBr}}
\]

d) \[
\text{[Structure]} \xrightarrow{\text{Hg(OAc)}_2} \xrightarrow{\text{NaBH}_4}
\]

e) \[
\text{[Structure]} \xrightarrow{\text{Br}_2} \xrightarrow{\text{H}_2\text{O}}
\]

2. Propose an efficient synthesis of each of the following compounds from the given starting material and any needed reagents or solvents (10 points each):

a) \[
\text{[Structure]} \xrightarrow{\text{from}} \text{[Structure with Br]}
\]
3. Propose a reasonable mechanism for the following reaction (5 points):

\[
\begin{align*}
\text{Br}_2 & \quad \text{CHCl}_3 \\
\text{converge} & \quad \text{from}
\end{align*}
\]

\[
\begin{align*}
\text{converge} & \quad \text{from}
\end{align*}
\]
1. Predict the major organic product or products obtained in each of the following reactions- (20 pts.)

![Reaction Diagram]

2. Propose a mechanism for the following reaction- (5 pts.)

![Mechanism Diagram]
3. Propose a 1 or 2 step synthesis of each of these compounds, from the given starting material and any other reagents and/or solvent. (15 pts.)

a)

b)

c)

4. Write the structure of the final product formed in following sequence of reactions (10 pts)

a)

b)

2) BH₃, THF
3) H₂O₂, NaOH