Moorpark College Chemistry 11  
Instructor: Professor Gopal

Examination #4 PRACTICE TEST2: Section Four

Name: ________________________________ (print)

<table>
<thead>
<tr>
<th>HX</th>
<th>H2</th>
<th>K2Cr2O7</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2O</td>
<td>Pt, Pd, Ru, or Ni</td>
<td>H2SO4</td>
</tr>
<tr>
<td>H+</td>
<td>H+ heat</td>
<td>1. NaBH4</td>
</tr>
<tr>
<td>X2</td>
<td>PCC</td>
<td>2. H2O</td>
</tr>
<tr>
<td>CHX3 or CH2X2</td>
<td>CH2Cl2</td>
<td>2 ROH, H+</td>
</tr>
</tbody>
</table>

REMEMBER: X is a halogen or a halide (fluorine, chlorine, bromine, or iodine depending on the question)! This sentence will not be given to you in the exam. You have to remember this information. Example: X2 could be Br2 and HX could be HBr.
1. Shown below are three structures. Indicate by circling the appropriate answer to the following questions:

   a. Is the structure a hemiacetal, an acetal, or neither?
   b. Was the structure produced from an aldehyde, a ketone, or neither?
   c. Draw the structure of the alcohol if any that was used in the reaction.

A. \( \text{CH}_3\text{CH}_2\text{CCH}_2\text{CH}_3 \)  
   Hemiacetal  Acetal  neither
   Aldehyde  Ketone  neither
   Alcohol:

B. \[ \begin{array}{c}
   \text{O} \\
   \text{O}
\end{array} \]  
   Hemiacetal  Acetal  neither
   Aldehyde  Ketone  neither
   Alcohol:

C. \[ \begin{array}{c}
   \text{O} \\
   \text{O}
\end{array} \]  
   Hemiacetal  Acetal  neither
   Aldehyde  Ketone  neither
   Alcohol:
2. For questions A-H, consider the descriptions below and select from the three fatty acid molecules shown (may be used more than once; more than one answer may be possible):

\[ \text{O} \quad \text{OH} \quad \text{O} \quad \text{OH} = \text{Molecule A} \]
\[ \text{O} \quad \text{OH} \quad \text{O} \quad \text{OH} = \text{Molecule B} \]
\[ \text{O} \quad \text{OH} \quad \text{O} \quad \text{OH} = \text{Molecule C} \]

A. expected highest melting point? _____________
B. fat at room temperature? _____________
C. saturated? _____________
D. unsaturated? _____________
E. expected lowest melting point? _____________
F. trans fat? _____________
G. consumption increases the risk of cardiovascular disease? _____________
3. **SEQUENCES!** Complete each reaction sequence below by providing the reagents or structures as indicated by the “?”.

*ONLY ANSWERS BY THE “?” WILL BE GRADED.*

If two products are possible, indicate only the MAJOR product.

\[ ? + ? \xrightarrow{\text{H}_2\text{SO}_4} \]

\[ \text{OH} \xrightarrow{\text{K}_2\text{Cr}_2\text{O}_7, \text{H}_2\text{SO}_4} ? \]

\[
\begin{align*}
? & \quad \xrightarrow{1. \text{NaBH}_4} \quad \text{OH} \\
& \quad \xrightarrow{2. \text{H}_2\text{O}} \quad \text{H} \\
& \quad \xrightarrow{\text{H}_2\text{SO}_4, \text{heat}} ?
\end{align*}
\]

\[
\begin{align*}
\text{OH} & \quad \xrightarrow{?} \quad \text{H} \\
& \quad \xrightarrow{?} \quad \text{H} \\
& \quad \xrightarrow{?} \quad + \text{Ag(s)}
\end{align*}
\]

\[ ? + ? \xrightarrow{\text{H}^+} \]

\[ \text{N}-\text{H} + \text{HCl} \xrightarrow{?} \]
4. **SYNTHESIS!** For questions **A** and **B** design a synthetic sequence using the properly ordered and appropriate reagents on the cover page of this examination to account for the following chemical transformation.

A.  
\[
\begin{array}{c}
\text{O} \\
\text{Br} \\
\text{Br} \\
\text{Br} \\
\end{array}
\xrightarrow{???} 
\begin{array}{c}
\text{Br} \\
\text{Br} \\
\text{Br} \\
\end{array}
\]

B.  
\[
\begin{array}{c}
\text{O} \\
\end{array}
\xrightarrow{???} 
\begin{array}{c}
\text{cyclopentane} \\
\end{array}
\]
5. Predict the MAJOR and MINOR products for the reaction listed below AND give the appropriate curved arrow notation for formation of each final product.
6. **NOMENCLATURE!** Use the appropriate IUPAC notation to name the following structure:

![Chemical Structure](image)

7. **TRUE AND FALSE!** Beside each statement below, write the full word **True** if the statement is true, or the full word **False** if the statement is false.

   ______ A. An organic oxidation involves the gaining of oxygen or loss of hydrogen.

   ______ B. A tertiary alcohol can be oxidized to a ketone.

   ______ C. A secondary carbocation is more stable than a tertiary carbocation.

   ______ D. During a reaction with potassium permanganate, a solution with a compound containing an alkene is expected to remain colored purple.

   ______ E. Functional groups are not responsible for the physical properties of a compound.

   ______ F. Aldehydes are more reactive than ketones

   ______ G. Alcohols have a higher boiling point than alkenes and alkynes due to hydrogen bonding.

   ______ H. Benedicts reagent reduces aldehydes to carboxylic acids.

   ______ I. Amines exhibit hydrogen bonding with water.

   ______ J. In unsaturated fatty acids, the cis isomer predominates over the trans isomer.