Practice Problems for Final Exam (Ch. 1-16)

from Dr. Rajapakse

Ch. 7/15 1. \[
\begin{array}{c}
\text{NaNH}_2 \\
\triangle \rightarrow \\
\text{excess} \\
\text{Na/H}_{2}
\end{array}
\]

Ch. 8 2. \[
\begin{array}{c}
\text{NBS} \\
\rightarrow
\end{array}
\]

OMIT 3. \[
\begin{array}{c}
\text{Br} \\
\text{PPh}_3 \\
\rightarrow \\
\text{NaH} \\
\text{CHO}
\end{array}
\]

Ch. 16

Ch. 6 4. \[
\begin{array}{c}
\text{excess} \\
k\text{MnO}_4^- \\
cold, dilute \\
alkaline
\end{array}
\]

Ch. 7 5. \[
\begin{array}{c}
\text{NaH} \\
\rightarrow \\
\text{CH}_3\text{I} \\
\rightarrow \\
\text{Na}/\text{NH}_3
\end{array}
\]

Ch. 3/9 6. \[
\begin{array}{c}
\text{Ph} \\
\text{Ph} \\
\text{Acetic Acid} \\
\rightarrow \\
\text{alkene}
\end{array}
\]

\text{OTs is a good leaving group}

Ch. 6 7. \[
\begin{array}{c}
k\text{MnO}_4^- \\
cold, dilute \\
alkaline \\
dry \text{HCl}
\end{array}
\]

Ch. 7/8 8. \[
\begin{array}{c}
\rightarrow \\
\text{HBr} \\
\text{peroxides}
\end{array}
\]

NOTE:
\[ \text{OMIT 8.} \quad \text{heat} \]

\[ \text{OMIT 9.} \quad \text{CH}_3\text{NH}_2 \]

\[ \text{OMIT 10.} \quad \text{H}^+ \]

\[ \text{OMIT 11.} \quad \text{LiAlH}_4 \quad \text{A} \rightarrow \text{B} \]

\[ \text{OMIT 12.} \quad \text{H}^+ / \text{H}_2\text{O} \]

\[ \text{OMIT 13.} \quad \text{Na}_2\text{Cr}_2\text{O}_7 / \text{H}^+ \]

\[ \text{OMIT 14.} \quad \text{NaBH}_4 \quad \text{dilute H}^+ \]

\[ \text{OMIT 15.} \quad \text{CH}_3\text{Cl} \quad \text{NaNH}_2 \quad \text{CH}_3\text{I} \quad \text{Na/ NH}_3 \]

\[ \text{OMIT 16.} \quad \text{OSO}_4 \quad \text{Na}_2\text{Cr}_2\text{O}_7 / \text{H}^+ \]

\[ \text{OMIT 17.} \quad \text{PhCO}_2\text{H} \quad \text{1. NaCN} \quad \text{H}_2 \quad \text{1.} \]

\[ \text{2. H}_2 / \text{catalyst} \]
OMIT 19.

Ch. 16

\[
\begin{align*}
\text{CH}_18 & \quad \xrightarrow{1. \text{O}_3} \quad \text{Zn, MgO}_5 \\
\text{CH}_4 & \quad \xrightarrow{2. \text{Zn, MgO}_5} \\
\end{align*}
\]

OMIT 22.

Ch. 16

\[
\begin{align*}
\text{CH}_4 & \quad \xrightarrow{1. \text{CH}_3\text{MgBr}} \quad \text{Gd}_3\text{H}_2\text{SO}_4 \quad \text{NH}_3 \\
\end{align*}
\]

OMIT 23.

Ch. 16

\[
\begin{align*}
\text{CH}_4 & \quad \xrightarrow{1. \text{LiAlH}_4} \quad 2. \text{H}_2\text{O} \\
\end{align*}
\]

OMIT 23.

Ch. 16

\[
\begin{align*}
\text{CH}_4 & \quad \xrightarrow{1. \text{H}_2/\text{Ni}} \quad \text{high pressure} \\
\end{align*}
\]
Orgo1 Final Practice Problems: I urge you to use this only as a supplement to practice problems of Prof. Horowitz's and problems in your book. This may be on the more challenging side, so please do not get discouraged if you struggle. However, use it as an opportunity to step up your game before the final.

Good Luck,
Prof. Murelli

1) Fill in the missing reagents/intermediates in the boxes shown

A)

\[\text{OMIT}\]

\[\text{PhOH}\]

\[\text{PCC}\]

\[\text{MeMgBr}\]

\[\text{CH}_3\text{CH}_2\text{OH}\]

\[\text{CH}_3\text{CH}_2\text{OH}\]

\[\text{H}_2\text{O}_2\]

\[\text{CH}_3\text{CH}_2\text{COOH}\]

B)

\[\text{OMIT}\]

\[\text{C}_8\text{H}_{16}\]

\[\text{Br}\]

\[\text{KOH-Bu}\]

\[\text{Br}_2\]

\[\text{C}_8\text{H}_{16}\]

C)

\[\text{OMIT}\]

\[\text{C}_8\text{H}_{16}\]

\[\text{OH}\]

\[\text{C}_8\text{H}_{16}\]

\[\text{CH}_3\text{CH}_2\text{OH}\]

\[\text{C}_8\text{H}_{16}\]

D)

\[\text{OMIT}\]

\[\text{C}_8\text{H}_{16}\]

\[\text{OH}\]

\[\text{C}_8\text{H}_{16}\]

\[\text{OCH}_3\]
2) Predict the Result of the Following Reaction. Use a chair structures to show your answer.

2b) If the above compound was not deuterated, what would be the relationship between the two products formed. Use structures to explain your answer.
3) What is the relationship between the following compounds. Also, do a quick practice of Newman Projections by drawing Newman structures of the two compounds of C.

\[
\begin{align*}
\text{A)} & \quad \text{vs.} & \quad \text{C)} \\
& \quad \text{vs.} & \quad \text{vs.} \\
\text{B)} & \quad \text{vs.} & \quad \text{OH}
\end{align*}
\]

4) The following molecule is Taxol. Try not to freak out looking at it. It has a lot of stereocenters in it, and thus is a nice compound to practice (R) and (S) stereochemistry without having to draw lots of different little dinky compounds. Try to circle all of the stereocenters in Taxol, and label them (R) or (S). Also, what would be the stereochemistry of the double bond?

5) Draw all possible neutral structures with the following molecular formulas:
   a) \(\text{C}_4\text{H}_4\text{O}\)  b) \(\text{C}_3\text{H}_4\text{O}\)  c) \(\text{C}_6\text{H}_6\)
5b) Of the structures drawn, which best fit the following NMRs?

A (C₄H₄O)

B (C₃H₄O)

C (C₆H₆)