(a) \[ \text{Ph} \text{O} \text{CO} \text{CO} \text{Ph} \xrightarrow{\text{pyridine}} \text{C}_{12}\text{H}_{17}\text{NO} \]

(b) compound A

\[ \text{OCH}_3 \text{O} \text{CO} \text{O} \text{Cl} \text{OCH}_3 \text{OCH}_3 \]

ionic byproduct

\[ \text{Cl} \text{O} \text{CO} \text{O} \text{Cl} \text{HN(CH}_2\text{CH}_3)_3 \]

product

\[ \text{OCH}_3 \text{O} \text{CO} \text{O} \text{OCH}_3 \text{OCH}_3 \]

reason 1: the carbonyl with the trichlorophenyl group is the better LG because of the electron-withdrawing effect of the chlorine atoms

reason 2: the carbonyl with the trichlorophenyl group is more sterically hindered because of the chlorine atoms
13.46

A. ester K

B. ester L

C. \( \text{SOCl}_2 \)

D. \( (R,E)-3\text{-ethyl-5-methyl-4,6-dioxo-2-hexenamide} \)

E. \( \text{Ph} \ O \ \overset{\text{CH}_3}{\text{O}} \)
Chapter 13

13.47

A. (a)

\[
\begin{align*}
\text{H}_3\text{CO} & \quad \text{O} \\
\text{H}_3\text{CO} & \quad \text{O} \\
\text{H}_3\text{CO} & \quad \text{O} \\
\text{HO} & \quad \text{OH} \\
\end{align*}
\]

(b) 3 would be in the form of their carboxylate salts

\[
\begin{align*}
\text{Na}^+ & \quad \text{O} \\
\text{Na}^+ & \quad \text{O} \\
\text{Na}^+ & \quad \text{O} \\
\text{HO} & \quad \text{OH} \\
\end{align*}
\]

the triol would remain the same

B. (a)

\[
\begin{align*}
\text{CH}_3 \\
\text{H}_3\text{C} & \quad \text{CH}_3 \\
\text{H}_3\text{C} & \quad \text{NCH}_3 \\
\text{O} & \quad \text{CONHCH}_3 \\
\end{align*}
\]

(b) the intramolecular reaction with the tertiary amine (as in using the added amines in so many acylation reactions) cannot be deprotonated, and so if it does get acylated, it simply then serves as a terrific, positively charged leaving group for a different acylation reaction that can go to completion
Chapter 13

13.48

(a) [Chemical structure]

(b) [Chemical structure]

(c) [Chemical structure]

(d) a dianion [Chemical structure]
1:1 ratio of starting materials gives a selective outcome

The product is not observed to add $\text{H}_2/\text{Pd-C}$.
A. (a) Ionic compound: pK$_a$ of most acidic proton ~5, and pK$_a$ of second most acidic proton ~9

Ionic compound with two different acidic protons, both with pK$_a$ of about 5

(b) Ionic compound: pK$_a$ of most acidic proton ~5, and pK$_a$ of second most acidic proton ~9

B. +

C. E A
(a) 
(i) Which compound corresponds to the $pK_a$ of 3.10?  
   □ C
(ii) Which compound corresponds to the $pK_a$ of 3.00?  
   □ A
(iii) Which compound corresponds to the $pK_a$ of 2.70?  
   □ B

(b)  
10^{0.4} \text{ times greater}

(c) 
(i) Which compound was fastest?  
   □ B
(ii) Which compound was slowest?  
   □ C

(d) 
\[
\begin{align*}
&\text{C} &\text{O} &\text{O} &\text{H} &\text{O} &\text{CH}_3 \\
&\text{Na} &\text{Na} &\text{Na}
\end{align*}
\]
A.

B.

1) LiAlH₄

2) H₂O, H₃O⁺
A. 

B. 

H₃C

\[
\begin{align*}
&\text{H}_{3}\text{C} \\
&\text{H}_{3}\text{C}
\end{align*}
\]