Multiple Choice

1. Choose the correct number of valence electrons palladium has in the following compound. class quiz

\[ \text{PPh}_3 \]
\[ \text{H} - \text{Pd} - \text{Br} \]
\[ \text{PPh}_3 \]

A. 10  B. 11  C. 14  D. 16  E. 18  F. 20

2. Select the major product of the following reaction sequence. (WS6 online quiz; q4)

\[ \text{O} \]
\[ \text{HO} - \text{HO} \]
\[ \text{H}^\ominus \]
\[ 1. \text{DIBAL-H} \]
\[ \text{H-Al(i-butyl)}_2 \]
\[ 2. \text{H}_2\text{O} \]
\[ \text{H}_3\text{O}^\oplus \]

A. \text{A}  B. \text{B}  C. \text{C}  D. \text{D}  E. \text{E}  F. \text{F}

3. Choose the major product of the following reaction (hint: pay attention to the stereochemistry of the addition and elimination reactions). class quiz

\[ \text{Br} \]
\[ \text{Pd(PPh}_3\text{P)}_4 \]
\[ \text{Et}_3\text{N} \]

A. \text{A}  B. \text{B}  C. \text{C}  D. \text{D}  E. \text{E}  F. \text{F}
4. Choose the major product(s) formed from the following reaction, which utilizes isotope labeling. (WS7 online quiz; q6)

\[
\text{O} \quad \xrightarrow{\text{H}^+ \text{H}_2\text{O}^{18}} \quad ?
\]

\[
\begin{align*}
\text{HO} & \quad \text{HO}^{18} & \quad \text{HO}^{18} & \quad \text{HO}^{18} \\
\text{i} & \quad \text{ii} & \quad \text{iii} & \quad \text{iv}
\end{align*}
\]

A. i  B. ii  C. i + ii  D. ii + iii  E. ii + iv  F. iii + iv

5. Choose the order that has the following benzoyl compounds correctly arranged with respect to increasing reactivity. (class quiz)

\[
\text{O} \quad \xrightarrow{\text{X}} \quad \text{O} \quad + \quad \text{X}^{\ominus}
\]

\[
\begin{align*}
\text{X} = \text{OCH}_3 & \quad \text{X} = \text{Cl} & \quad \text{X} = \text{SCH}_3 \\
\text{i} & \quad \text{ii} & \quad \text{iii}
\end{align*}
\]

A. \text{ii i iii increasing reactivity}  B. \text{iii i ii increasing reactivity}  C. \text{ii i iii increasing reactivity}

D. \text{ii iii i increasing reactivity}  E. \text{iii ii i increasing reactivity}  F. \text{iii i ii increasing reactivity}

6. Choose the compound that corresponds to the name benzoyl chloride. (text 17.18)

\[
\begin{align*}
\text{Cl} & \quad \text{Cl} & \quad \text{Cl} & \quad \text{Cl} & \quad \text{Cl} & \quad \text{Cl} \\
\text{A} & \quad \text{B} & \quad \text{C} & \quad \text{D} & \quad \text{E} & \quad \text{F}
\end{align*}
\]
7. Choose the intermediate(s) in the acid catalyzed hydrolysis of the following amide. class quiz

\[
\begin{align*}
\text{N} & \xrightarrow{H^+} \text{H}_3\text{N} \\
\text{H} & \xrightarrow{H_2O} \text{O} \\
\end{align*}
\]

A i + ii  B ii + iii  C iii + iv  D i + iii  E ii + iv  F i + iv

8. Choose the order that has the following carbonyl compounds correctly arranged with respect to their $K_a$ of hydration. class quiz

\[
\begin{align*}
\text{R} & \xrightarrow{H_2O} \text{R} \\
\text{H} & \xrightarrow{CH_3} \text{H} \\
\text{H} & \xrightarrow{CF_3} \text{H} \\
\end{align*}
\]

A i ii iii increasing $K_a$ of hydration  B i iii ii increasing $K_a$ of hydration  C ii i iii increasing $K_a$ of hydration  D ii iii i increasing $K_a$ of hydration  E iii ii i increasing $K_a$ of hydration  F i iii ii increasing $K_a$ of hydration
9. Select the reductive elimination step in the following organometallic reaction. (WS5 online quiz: q4)

10. Arrange the following compounds in order of their reactivity toward LiAlH₄. class quiz

Short Answer

11. Predict the major product of the following reaction. 5 pts

12. Predict the major product of the following reaction. 5 pts
13. Give reagents that could be used to accomplish the following transformation. The number of arrows does not necessarily correspond to the number of required steps, but more than one reaction will be necessary. Your answer only needs to show the reagents. 5 pts (WS7 pt 2; q1)

14. Based on the information given below, determine and clearly draw the structures of compounds A, B, C, and D. All four compounds are distinct. 10 pts (WS 6 pt 2; q1 & q3) 10 pts

15. Using the curved arrow formalism show how the bond making and bond breaking occurs in the following reaction. 5 pts
16. Using the curved arrow formalism show how the bond making and bond breaking occurs in the following reaction. 10 pts

17. Frontalin is a chemical message of musth in Asian elephants. Propose a synthesis of frontalin from compounds containing four carbon atoms or less. 10 pts