Exam 3

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. What is the best choice of reagent(s) to perform the following transformation?
   - a. BH₃; followed by H₂O₂, NaOH
   - b. H₂/Pt
   - c. Na/NH₃
   - d. H₂/Lindlar catalyst

2. What is the major organic product obtained from the following reaction?
   - a. 1
   - b. 2
   - c. 3
   - d. 4

3. What is the best choice of reagent(s) to perform the following transformation?
   - a. H₂/Lindlar catalyst
   - b. H₂/Pt
   - c. BH₃; followed by H₂O₂, NaOH
   - d. Na/NH₃
4. What is the best choice of reagent(s) to perform the following transformation?

\[ \text{CH}_3\text{C} \equiv \text{C} \equiv \text{C} \equiv \text{H} \quad \overset{?}{\longrightarrow} \quad \text{CH}_3\text{C} \equiv \text{C} \equiv \text{C} \equiv \text{H} \]

a. 2 moles of Br$_2$
b. 2 moles of HBr
c. 1 mole of Br$_2$
d. 1 mole of HBr

5. What is the systematic IUPAC name of the following compound?

\[ \text{CH}_3\text{CH} = \text{C} \equiv \text{C} \equiv \text{C} \equiv \text{C} \equiv \text{H} \]

a. (3S,4Z)-3-ethyl-3,4-dimethyl-1,4-hexadiene
b. (3S,4E)-3-ethyl-3,4-dimethyl-1,4-hexadiene
c. (3R,4E)-3-ethyl-3,4-dimethyl-1,4-hexadiene
d. (3R,4Z)-3-ethyl-3,4-dimethyl-1,4-hexadiene

6. What is the major organic product obtained from the following series of reactions?

\[ \text{CH}_3\text{C} \equiv \text{C} \equiv \text{C} \equiv \text{H} \overset{1. \text{NaNH}_2}{\longrightarrow} \overset{2. \text{CH}_3\text{I}}{\longrightarrow} \overset{\text{H}_2\text{O}, \text{HgSO}_4}{\longrightarrow} \overset{\text{H}_2\text{SO}_4}{\longrightarrow} \]

a. 1-propanol, CH$_3$CH$_2$CH$_2$OH
b. butanone, CH$_3$COCH$_2$CH$_3$
c. propanal, CH$_3$CH$_2$CHO
d. butanal, CH$_3$CH$_2$CH$_2$CHO

7. What is the major organic product obtained from the following series of reactions?

\[ \text{CH}_3\text{C} \equiv \text{C} \equiv \text{C} \equiv \text{H} \overset{\text{NaNH}_2}{\longrightarrow} \overset{\text{Ph-Br}}{\longrightarrow} \overset{\text{Lindlar catalyst}}{\longrightarrow} \overset{\text{H}_2}{\longrightarrow} \]

a. 6-phenyl-1-hexene
b. (E)-6-methyl-3-heptene
c. (Z)-6-phenyl-2-hexene
d. (E)-5-phenyl-2-pentene
8. What is the major organic product obtained from the following series of reactions?

\[
\text{CH}_3\text{C}≡\text{CH} \xrightarrow{\text{NaNH}_2} \text{CH}_3\text{C}≡\text{CHBr} \xrightarrow{\text{H}_2, \text{Lincllar catalyst}}
\]

a. 1  
b. 2  
c. 3  
d. 4

9. What is the best choice of reagent(s) to perform the following transformation?

\[
\text{H}_3\text{C}−\text{C}−\text{C}−\text{H} \xrightarrow{?} \text{H}_3\text{C}−\text{C}≡\text{C}−\text{H}
\]

a. H\text{H}_2\text{O}; \text{H}_2\text{SO}_4  
b. Zn  
c. KMnO_4, NaOH, H\text{H}_2\text{O}  
d. 1.3 \text{ moles of NaNH}_2; 2. \text{H}_3\text{O}^+

10. What is the major organic product obtained from the following reaction?
11. What is the best choice of reagent(s) to perform the following transformation?

\[ \begin{align*}
\text{CH}_2=\text{CH}-\text{C} &= \text{CH} \quad \rightarrow \quad \text{CH}_2=\text{C} - \text{H} \\
\text{H}_2\text{C} &= \text{C} - \text{Br} \quad \text{Br} \\
\end{align*} \]

a. 1 mole of Br₂  
 b. 2 moles of Br₂  
 c. 1 mole of HBr  
 d. 2 moles of HBr

12. Which of the following is most likely to undergo rearrangement during reaction with methanol?

a. 1  
 b. 2  
 c. 3  
 d. 4

13. What is the major organic product obtained from the following reaction?

\[ \text{1, H}_2\text{C} - \text{C} = \text{O} \quad \xrightarrow{1. \text{BH}_3} \quad \text{1, H}_2\text{C} - \text{C} = \text{H} \quad \xrightarrow{2. \text{H}_2\text{O}_2, \text{NaOH}} \quad \text{1, H}_2\text{C} - \text{C} = \text{O} \]

a. 1  
 b. 2  
 c. 3  
 d. 4
14. What is the major organic product obtained from the following series of reactions?

\[
\begin{align*}
\text{H}_3\text{C} & \quad \text{C} \equiv \text{C} \quad \text{H} \\
\text{NaNH}_2 & \quad \text{Br} \quad \text{Na} \\
\text{NH}_3 (\ell) & \quad \text{H}_3\text{C} \quad \text{C} \equiv \text{C} \quad \text{H}
\end{align*}
\]

a. (E)-2-heptene
b. heptane
c. (Z)-2-heptene
d. 1-heptene

15. What is the IUPAC name of the following compound?

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

a. (R)-4-methyl-2-hexyne
b. (R)-3-methyl-4-hexyne
c. (S)-3-methyl-4-hexyne
d. (S)-4-methyl-2-hexyne

16. What is (are) the major organic product(s) formed in the following reaction?

\[
\begin{align*}
\text{1 mol HBr} & \quad \text{Br} \\
\text{Br} & \quad \text{Br} \\
\text{Br} & \quad \text{Br}
\end{align*}
\]

a. only 1
b. only 2
c. only 3
d. 1, 2 and 3
17. What is the major organic product obtained from the following reaction?

\[
\text{C}_2\text{H}_4 + \text{H}_2 \xrightarrow{\text{Lindlar catalyst}} \text{C}_6\text{H}_{12}
\]

a. 1 
b. 2 
c. 3 
d. 4

18. What is (are) the major organic product(s) formed in the following reaction?

\[
\text{C}_2\text{H}_4 + \text{Br}_2 \xrightarrow{1 \text{ mol Br}_2} \text{C}_6\text{H}_{12} \text{Br}_2
\]

a. only 1 
b. only 1 and 3 
c. only 2 and 4 
d. only 1 and 4

19. What is(are) the major organic product(s) obtained from the following substitution reaction?

\[
\text{C}_6\text{H}_{12} \text{Br} \xrightarrow{\text{CH}_3\text{OH}} \text{C}_6\text{H}_{12} \text{OCH}_3
\]

a. only 1 
b. only 2 
c. only 3 
d. a mixture of 1 and 2
20. What is the best choice of reagent(s) to perform the following transformation?

\[
\text{H}_3\text{C}\text{CH}_2\text{C}_3\text{CH} \quad \text{?} \quad \text{H}_3\text{C}\text{CH}_2\text{CH}_2\text{C}_2\text{H}_3
\]

a. Na/NH\textsubscript{3}
b. BH\textsubscript{3}; followed by H\textsubscript{2}O\textsubscript{2}, NaOH
c. H\textsubscript{2}/Lindlar catalyst
## Exam 3

### Answer Section

### MULTIPLE CHOICE

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<tr>
<td>1.</td>
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<td>2.</td>
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<td>3.</td>
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<td>6.</td>
<td>ANS: B</td>
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<td>7.</td>
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<td>8.</td>
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<td>11.</td>
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<td>PTS: 5</td>
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<tr>
<td>12.</td>
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<tr>
<td>13.</td>
<td>ANS: D</td>
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<tr>
<td>14.</td>
<td>ANS: A</td>
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<tr>
<td>15.</td>
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<td>16.</td>
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<tr>
<td>17.</td>
<td>ANS: A</td>
<td>PTS: 5</td>
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<tr>
<td>18.</td>
<td>ANS: D</td>
<td>PTS: 5</td>
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<td>19.</td>
<td>ANS: D</td>
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<td>20.</td>
<td>ANS: B (The correct answer is B). The bubble score card was noted as D. Everyone received 5 PTS on this question #20.</td>
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