Name:_____

1. Circle the correct solution for each question. (10 points)

i. O
$$CI$$
 (1 equiv.)

v.
O
A.
B.
C.
d.
BH
$$_3$$
*THF
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2. Provide the product for the following reactions. (10 points)

a.
$$\begin{array}{c} O \\ \hline \\ \text{pH 4.5, -H}_2O \end{array}$$

3. Provide a mechanism for the following transformation. (4 points)

- 4. a. Provide a mechanism for the following transformation.
 - b. Explain why pH 4.5 is optimal for this reaction. (7 points)

- 5. a. Provide a mechanism for the following transformation. (6 points)
 - b. Explain why DMAP is necessary for this reaction.

$$\begin{array}{cccc}
OH & O & O \\
\hline
OH & Et_3N & O \\
\hline
N-N & N & O \\
\hline
(DMAP)
\end{array}$$

6. Provide a mechanism for the following reaction. (7 points)

7. Provide a synthesis for the following transformations. (8 points)