Be certain that your examination has five (5) pages including this one.

Put your name on each page of this examination booklet.

By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.
1. (25 points)

For each of the following five (5) questions write the reagent (or sequence of reagents) that will effect the desired transformation. More than one reaction may be required to achieve the conversion.

A.

B.

C.

D.

E.
2. (25 points)

For each of the following five (5) questions draw the structure of the expected major organic product. If relevant, explicitly specify absolute and/or relative stereochemistry.

A.

\[ \text{H}_3\text{C} - \text{CH}_2 - \text{CH}_2 \rightarrow \text{HCl} \]

B.

\[ \text{H}_3\text{C} - \text{CH}_3 - \text{CH}_3 \rightarrow \text{a.) LDA} \]

\[ \text{b.) H}_3\text{Cl} \]

C.

\[ \text{N} - \text{H}_2\text{C} - \text{Br} \rightarrow \text{a.) H}_2\text{C} - \text{CH}_2 \]

\[ \text{b.) dil. H}_3\text{O}^+ \text{ Cl}^- \]

D.

\[ \text{H}_3\text{CO} - \text{CH} - \text{CH}_2 - \text{CH} - \text{CO} \rightarrow \text{a.) NaOCH}_3 \]

\[ \text{b.) dil. H}_3\text{O}^+ \text{ Cl}^- \]

E.

\[ \text{H}_2\text{C} = \text{CH}_2 \rightarrow \text{TiCl}_3 \]

\[ \text{Et}_3\text{Al} \]
3. (25 points)

Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show all intermediates and denote all unshared electrons, formal charges and countercharges where appropriate. Clearly denote reversibility or irreversibility for each primary mechanistic step.

\[ \text{CH}_3\text{O} \quad \text{H}_3\text{C} \quad \text{aq. Na}^+ \quad \text{OH} \quad \text{CH}_3 \quad \text{H}_3\text{C} \quad \text{H}_2\text{O}^+ \]
4. (25 points)

Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show all intermediates and denote all unshared electrons, formal charges and countercharges where appropriate. Clearly denote reversibility or irreversibility for each primary mechanistic step.

![Mechanism Diagram]

(mixture of α- and β-anomers)

Congratulations!

1 /25
2 /25
3 /25
4 /25
Total: /100