Organic Chemistry I Examination 3

Name: ______________________

1. Give one example of each:
   (9)
   an enol
   a molozonide
   an endo diene
   a dienophile
   a diels alder reaction
   a 1,4 addition product

2. Give a complete mechanism for any one of the following:
   Hydroboration of an unsymmetric alkene
   Carbene addition with the use of CHCl₃/KOH to cyclohexene
   (6)

3. Give a complete mechanism for any one of the following
   Hydroboration of a terminal alkyne
   Burch reduction of an internal alkyne
   (7)

4. Explain why:
   (12)
   a. Acetyline can be converted to acetylide ion when treated with NaNH₂
   b. A hydrogen on an allylic carbon can be dissociated easily.
   c. Radical chlorination of an alkane may not be a good industrial synthetic process for alkyl halides.
   d. Internal alkynes give only ketones upon hydration.

5. Give a complete mechanism for any one of the following:
6. Give all the steps that are to be followed to prepare the following compound starting with acetylene as the only source of carbons in this molecule.

\[ \begin{align*}
&\text{CH}_2=\text{CH}=	ext{CH}_2 \\
&\text{CH}_2=\text{CH}=	ext{CH}=	ext{CH}_2
\end{align*} \]

7. An organic mystery molecule was analyzed to have the molecular formula to be \( \text{C}_{12}\text{H}_{12} \). This compound was reacted with hydrogen under catalytic conditions and after the reaction the product was found to have a molecular formula of \( \text{C}_{12}\text{H}_{24} \). The mystery compound was ozonolyzed and following products were isolated. Please draw the structure of the mystery compound. Show how did you arrive at your structure.

\[ \begin{align*}
&\text{O}=\text{C}=\text{O} \\
&\text{O} \quad \text{0} \quad \text{O} \quad \text{0} \\
&\text{CO}_2 \quad \text{HO}_2 \quad \text{CH}_2=\text{CH} \quad \text{O}=\text{C}=\text{O}
\end{align*} \]

8. With the use of appropriate energy diagrams, explain how organic reactions can be manipulated to yield desired products. Select an appropriate reaction to illustrate this.

9. List three bases that are stronger than \( \text{OH}^- \)

10. Give any three alkenes, give the polymer unit as a result of polymerization of these alkenes.

11. Complete the following reactions:

(6) \[ \text{NBS/hV} \quad \text{six isomeric products} \]

(3) \[ \text{KMnO}_4 /\text{mild OH}^- \]

(4) \[ ? \quad ? \]

(3) \[ \text{HgSO}_4/\text{H}_3\text{O}^+ \]

(3) \[ \text{Acid, NaCl} \]

(3) \[ 1. \text{NaNH}_2 \quad 2. \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} \]

(3) \[ \text{BH}_3/\text{H}_2\text{O}_2/\text{OH}^- \]

(3) \[ 1 \text{mole HI, high temp} \]

(4) \[ \text{Diel's Alder} \]