1) Which alkene will form from the following reaction?

\[
\text{CH}_3 \quad \text{CH}_3 \quad \text{CH}_3 \quad \text{CH}_3 \quad \text{CH}_3 \quad \text{CH}_3
\]

\[
\text{CH}_3\text{CH}_2\text{Br} + \xrightarrow{\text{KOH, reflux}} \text{CH}_3\text{CH}_2\text{C}==\text{CH}_2 \quad ? \quad \text{CH}_3\text{CH}_2\text{C}==\text{CH}_3\text{CH}_2==\text{CH}_3\text{CH}_3
\]

2) Which of the following carbocation will undergo rearrangement?

\[
\text{CH}_3\text{CHCH}_3 + \text{CH}_3\text{CH}_2\text{CH}_3 \quad \xrightarrow{\text{CH}_3\text{CH}_2\text{C}==\text{CH}_3} \quad \text{CH}_3\text{CHCH}_3 + \text{CH}_3\text{CHCH}_2^+
\]

3) Write the mechanism for the following E1 reaction. Rearrangement will occur in this reaction. Start by forming a carbocation, move it to a more stable position, then see where you have $\beta$-H to eliminate. You should form two products. Which is major? Label them as Zaitsev's and Hoffman products.

4) When 2,2-dimethylcyclo-1-hexanol is dehydrated it gives at least two alkenes, one major and one minor. Give a mechanism for this reaction. Which product is the higher ratio product?
5) Which of the following reactions would produce the following alkene in a reasonable percentage yield, i.e., greater than 50%?

\[ \begin{align*}
\text{I} & \xrightarrow{\text{H}_2\text{SO}_4, \text{heat}} \text{II} \\
\text{III} & \xrightarrow{\text{NaI, acetone}}
\end{align*} \]

6) Which product (or products) would be formed in appreciable amount(s) when trans-1-bromo-2-methylcyclohexane undergoes dehydrohalogenation upon treatment with sodium ethoxide in ethanol?

\[ \begin{align*}
\text{I} & \quad \text{II} & \quad \text{III} & \quad \text{IV}
\end{align*} \]