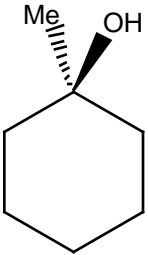


**GTQ on Wittig Reaction.** (30 points, stereochem., mech., recogn. and syn. elements)

The Wittig reaction is a method for the preparation of \_\_\_\_\_ by reaction of an \_\_\_\_\_ with a carbonyl compound. It is the great advantage of the Wittig reaction that just one single positional isomer is produced. (2 points)

(a) Consider the acid-catalyzed water elimination reaction (dehydration) of the cyclic alcohol shown. Draw the structures of the two possible constitution isomeric alkenes in the appropriate boxes for the minor and major products. Explain the reason for its preferential formation.

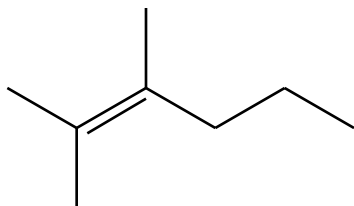
<p>starting material</p> 	<p><b>major</b> alkene product</p>    <p>(2 points)</p>	<p><b>minor</b> alkene product</p>    <p>(2 points)</p>
<p>Explain (4 points):</p>          		

(b) With the Wittig reaction, we can make either one of the alkene isomers produced in (a) in a selective fashion. Write down the overall Wittig reactions (give the ylide and the carbonyl compound) that lead to the minor and to the major products.

<p>Ylide and carbonyl leading to <b>minor</b> product</p>          <p>(3 points)</p>	<p>Ylide and carbonyl leading to <b>major</b> product</p>          <p>(3 points)</p>
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(c) Provide a synthesis of 2,3-dimethyl-2-hexene. Start from an alkyl iodide and triphenylphosphine. Show all intermediates along the reaction sequence. Suggest a preparative route to the carbonyl compound you are employing. (14 points)

**Synthesis of 2,3-dimethyl-2-hexene via Wittig (8 points):**



**Preparation of the carbonyl (6 points):**