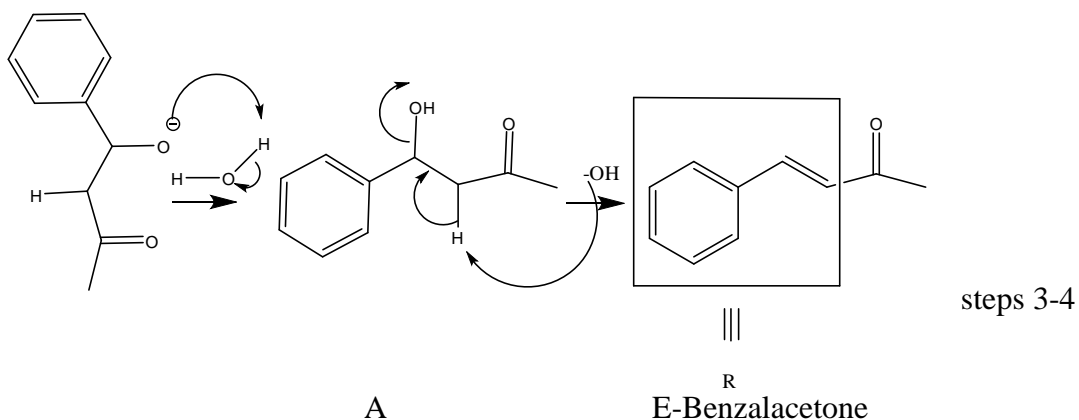
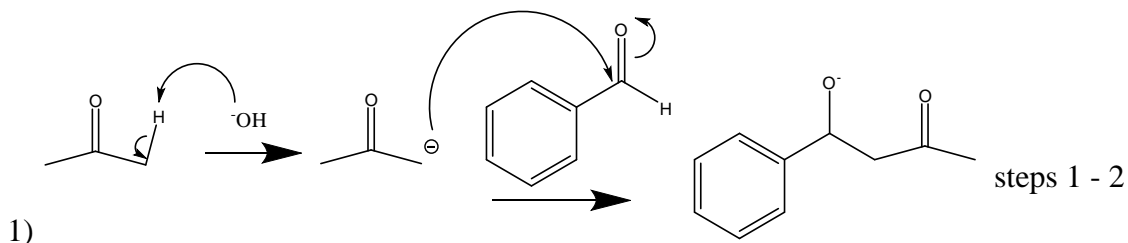


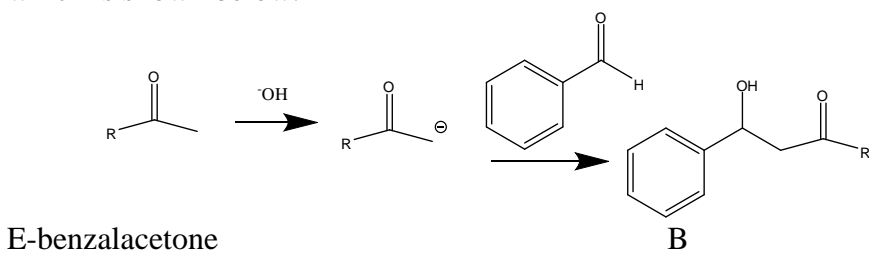
Advanced Study Assignment
Organic 212L
Aldol Condensation

Name: _____

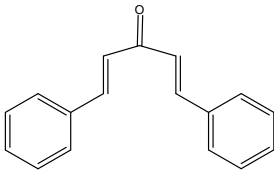


The first four (1-deprotonation, 2-nucleophilic addition of enolate to aldehyde, 3-protonation of the alkoxide, and 4- elimination) steps of the Claisen-Schmidt reaction are shown above. An E_2 elimination from compound A (step 4) could give either E-Benzalacetone, which is shown above, or Z-Benzalacetone. Draw Z-Benzalacetone.

2) E-benzalacetone is favored from A and will be used in the next three steps of the reaction which are just like steps 1 -3 above. R equals the styrene part of benzalacetone which is shown below.



An E₂ elimination for B could form trans, trans – dibenzalacetone or trans, cis – dibenzalacetone. Trans, trans –dibenzalacetone (diastereomer 1) is shown below and is the major isomer formed.



a) Draw trans, cis –dibenzalacetone (diastereomer 2) below.

b) Draw diastereomer 3. It is cis, cis –dibenzalacetone. It is not formed from E-benzalacetone but from Z-benzalacetone.

3) Dibenzalacetone has configurations and conformations. Configuration requires breaking bonds for interconversion between configurations. Conformations require only bond rotation for interconversion between conformations.

How are R – 2- butanol and S-2-butanol are related? _____

They are (configurations or conformations?) _____ of each other.

How are chair cyclohexane and boat cyclohexane related (configurations or conformations)? _____

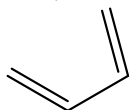
How are trans, trans –dibenzalacetone and trans, cis –dibenzalacetone related? (enantiomers, diastereomers, constitutional isomers, or the same) _____

They are (configurations or conformations?) _____ of each other.

How are trans, cis – dibenzalacetone and cis, cis –dibenzalacetone related? (enantiomers, diastereomers, constitutional isomers, or the same) _____

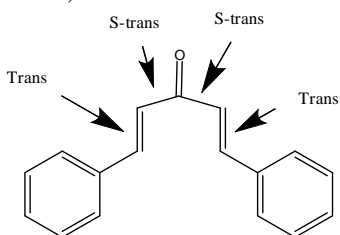
They are (configurations or conformations?) _____ of each other.

Remember that for 1,3-butadiene we could draw s-cis-1,3-butadiene or s – trans-1,3-butadiene. S stands for single bond and in this case if the double bonds are on the same side, it is called s-cis. s-cis-1,3-butadiene is shown below.

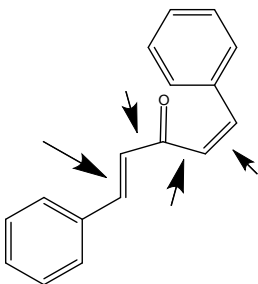


Draw s-trans-1,3-butadiene below.

4) For dibenzalacetone, we look at FOUR things to name the compound. We look at the first double bond to see if it is cis or trans. We then look at the single bond and see if the carbon-carbon double bond and carbon-oxygen double bond are on the same side or opposite sides of the SINGLE BOND. If they are on the same side of the SINGLE BOND, it is called s-cis. If they are opposite sides of the SINGLE BOND, it is called s-trans. We then look at the other single bond and label it s-cis or s-trans and finally we look at the other double bond to see if it is cis or trans. Given below is trans, s-trans, s-trans, trans. We read from left to right.



Label the molecule below.



Draw cis, s-cis, s-trans, cis below.

5) a) The procedure calls for 2.9 grams of acetone. How many moles of acetone are you adding? SHOW YOUR WORK.

b) The procedure calls for 10.6 grams of benzaldehyde. How many moles of benzaldehyde are you adding? SHOW YOUR WORK.

6) Describe how you are going to recrystallize your product.

7) Given below is the complete reaction showing formation of one of the diastereomers. Given 10.9 g of benzaldehyde and 2.9 grams of acetone, what is the theoretical yield? SHOW YOUR WORK!

