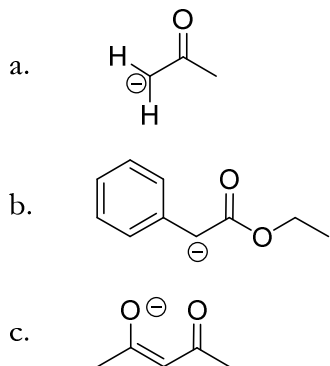


Experiment 24

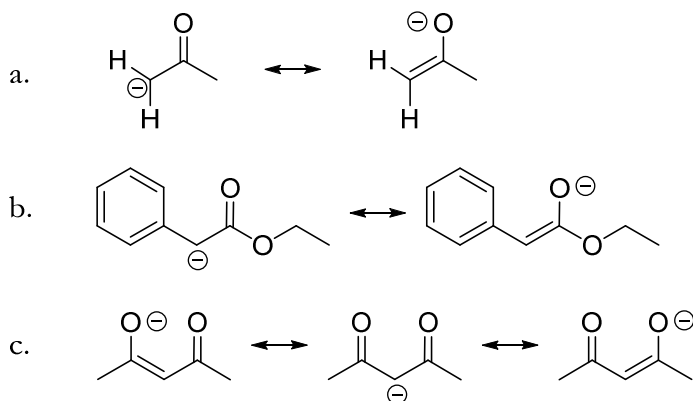
Aldol Condensation: Synthesis of Tetracyclone

Study Questions

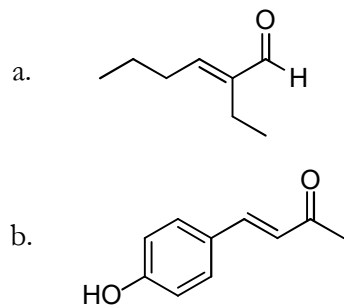
1) Draw the resonance structures for the following enolate ions:



Answer:

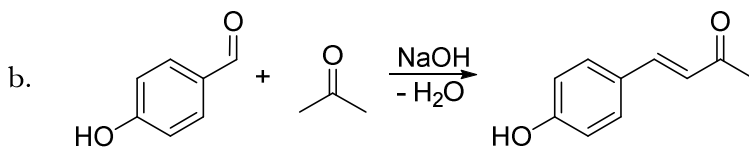
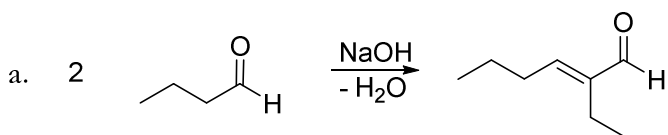


2) Using an aldol or crossed aldol condensation, suggest a synthesis of the following compounds:



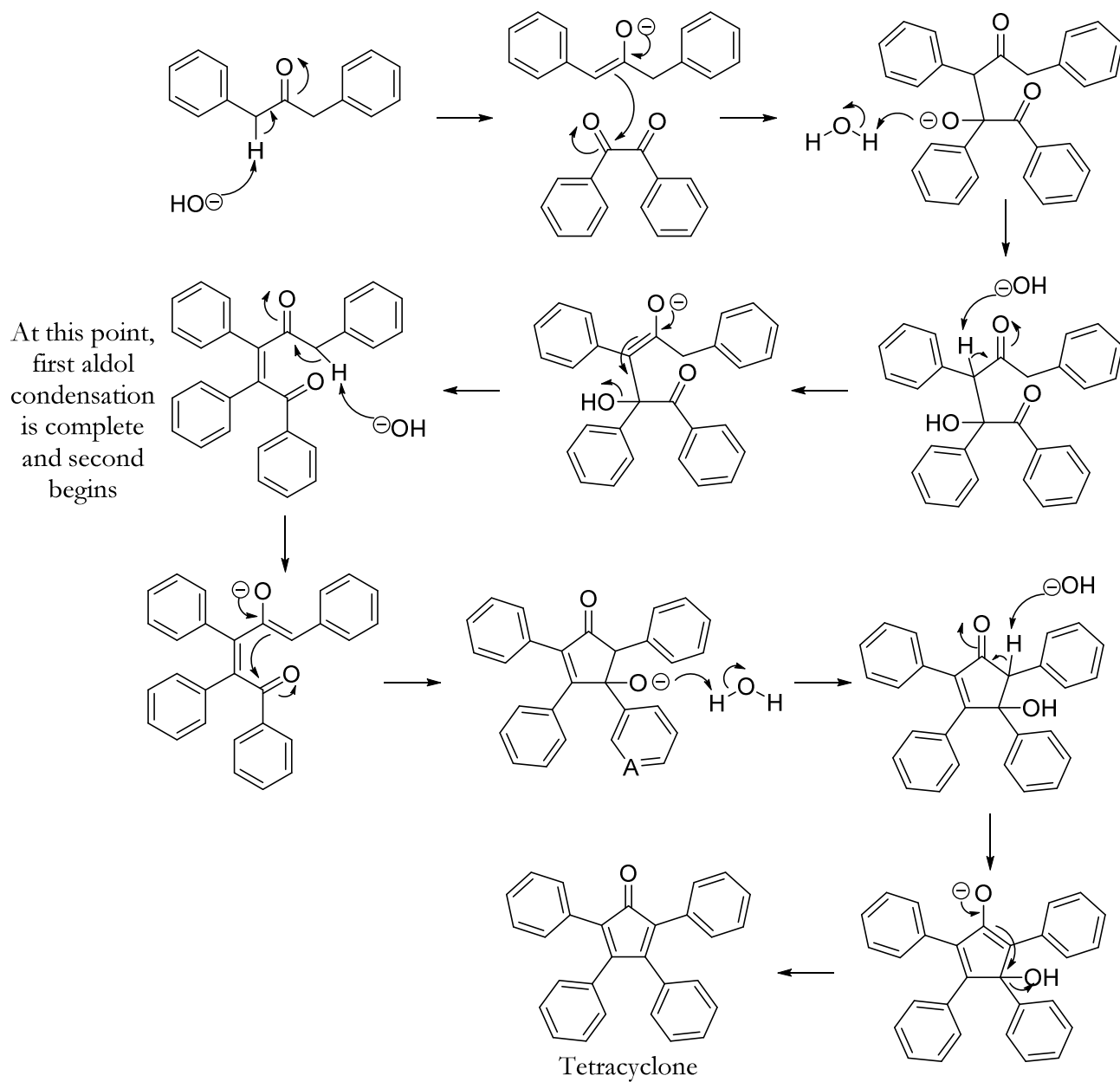
Answer:

Experiment 24: Aldol Condensation



3) Draw the mechanism for the reaction you will perform during today's experiment.

Answer:



- 4) Even though both the starting materials for this experiment are white or yellow, the final product is a dark purplish-black. Explain this information, based on what you know about light absorption and conjugation.

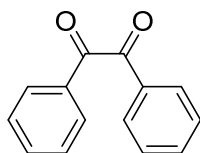
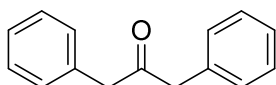
Answer: The more conjugation a molecule has, the smaller the HOMO-LUMO gap will be, and the lower the absorption peak (λ_{max}). Tetracyclone is so extensively conjugated that it absorbs most light in the visible region.

- 5) Calculate the atom economy for this experiment.

Answer:

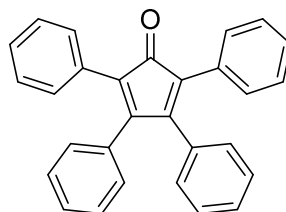
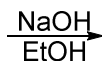
1,3-Diphenylacetone

MW = 210.27



Benzil

MW = 210.23



Tetracyclone

MW = 384.48

Atom economy =

$$\frac{384.48}{210.27 + 210.23}$$

91.4%