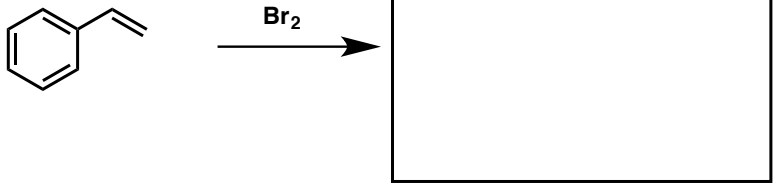
CHEM 3332 Honors

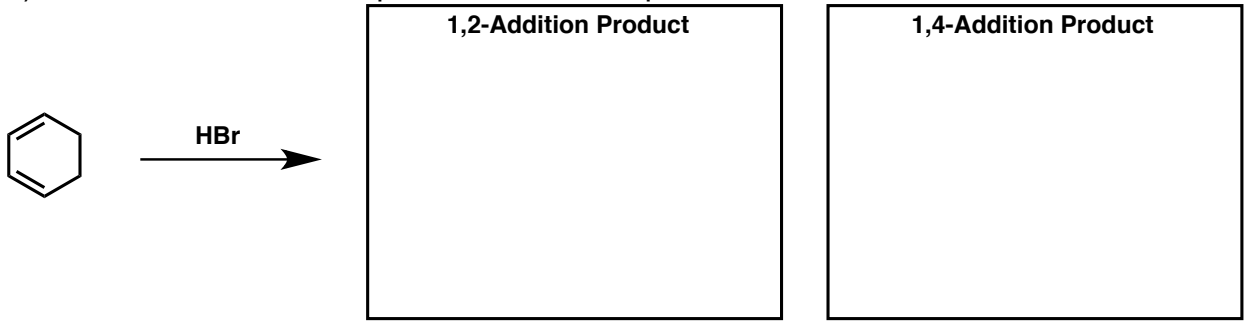
Homework for Conjugation, Allyl Resonance, and Electrocyclizations

1. Predict the major product (or products) for these reactions. Don't forget to show the stereochemistry in the products if the reaction is stereoselective.

A.



B) Describe the relationship between the two products.



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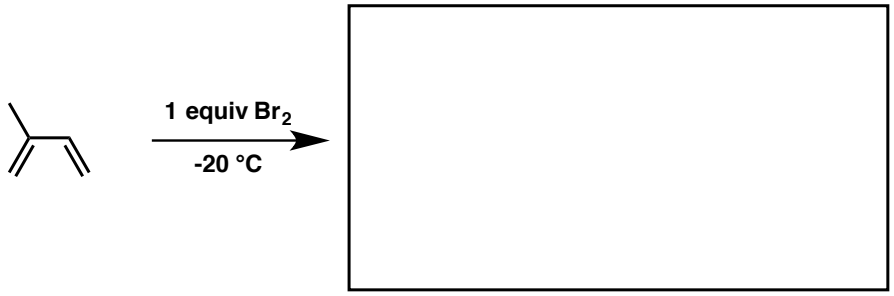

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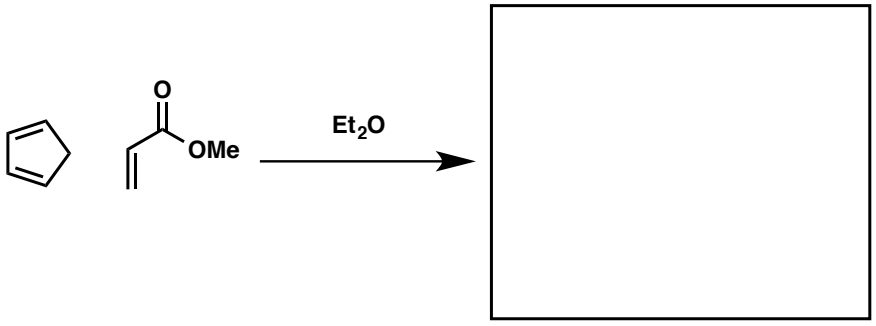
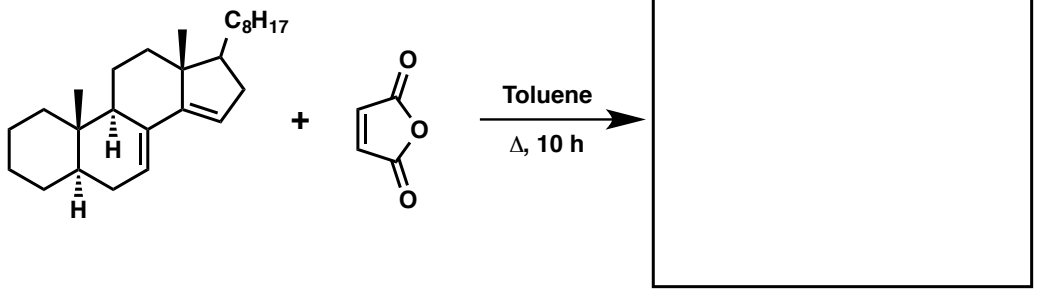
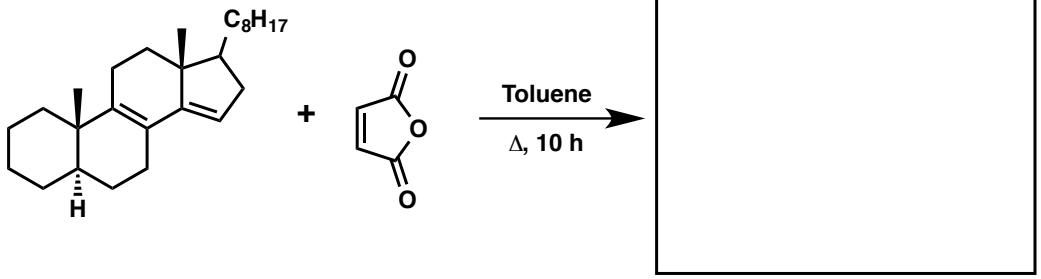


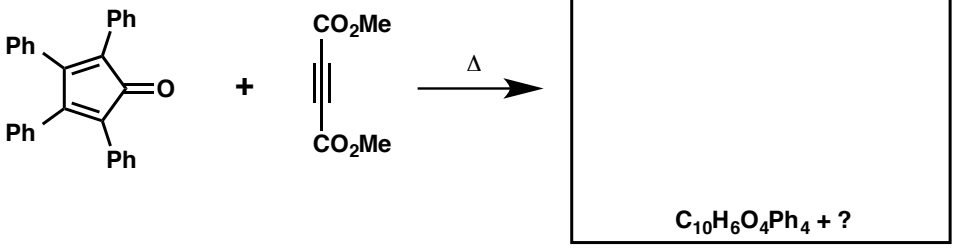
E.


C8H17
H
H
+
O
O
O
Toluene
Δ, 10 h

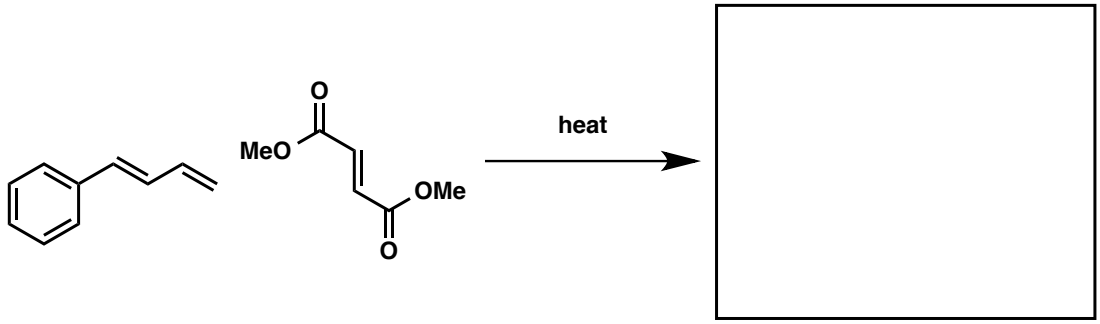
F.


C8H17
H
+
O
O
O
Toluene
Δ, 10 h

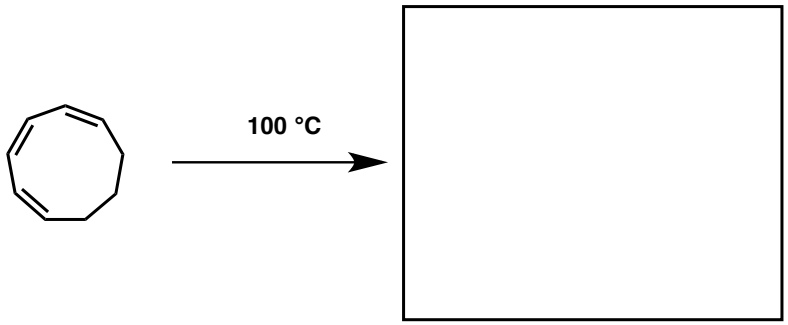
G.


Ph
Ph
Ph
Ph
O
+
CO2Me
CO2Me
Δ
C10H6O4Ph4 + ?

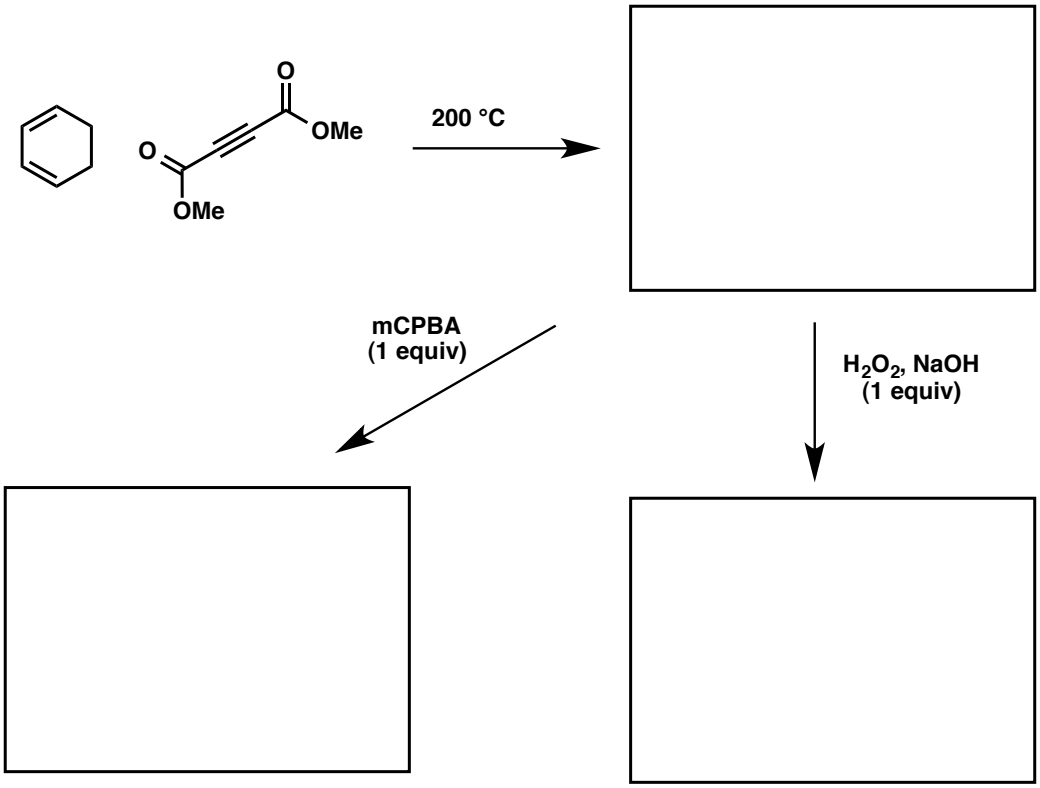
H.


MeO
O
OMe
O
heat

I.

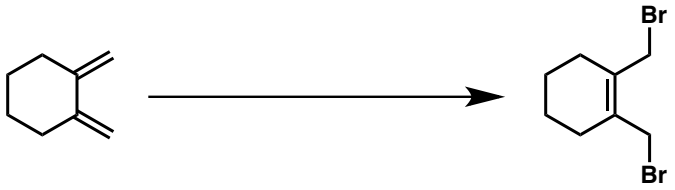


J. Show the mechanism for this transformation, also.



3. Give reagents to perform the following transformations.

A. What major byproduct would you expect?



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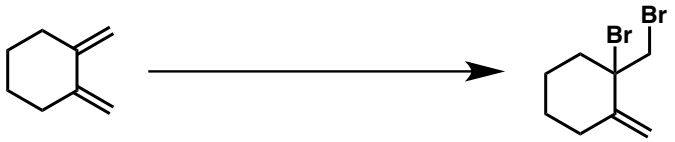

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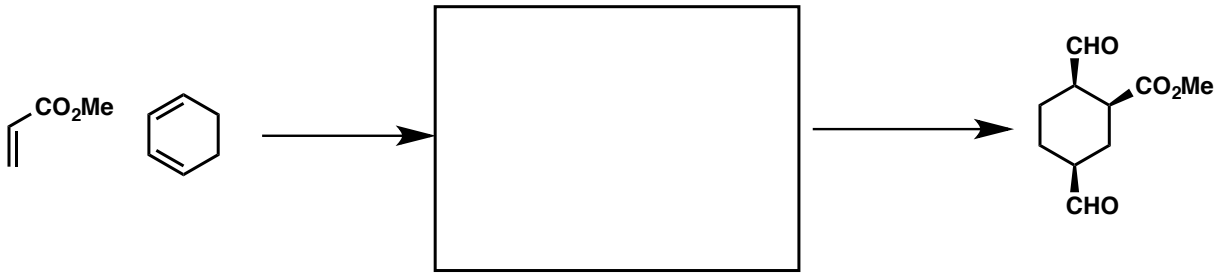

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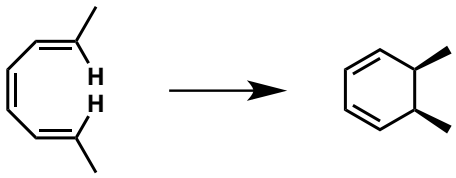
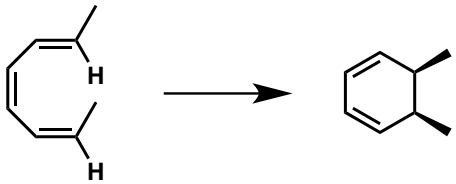


E.



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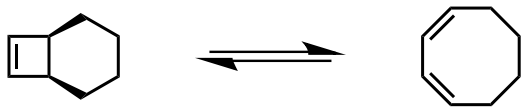
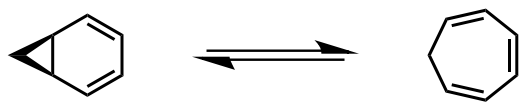
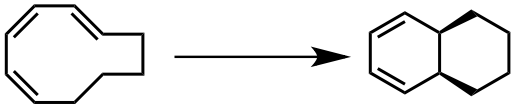


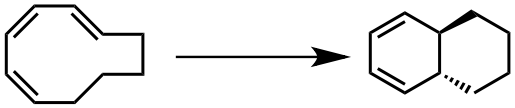
G.



H.

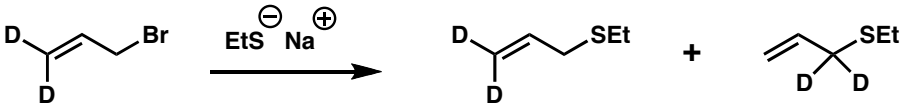


I.



4. Propose a mechanism for these reactions.

A.



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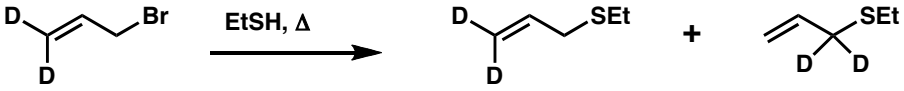

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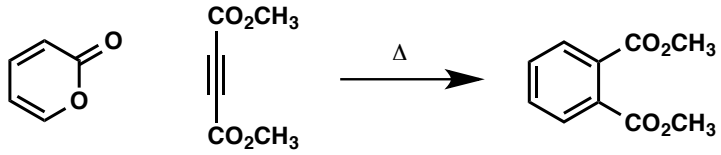
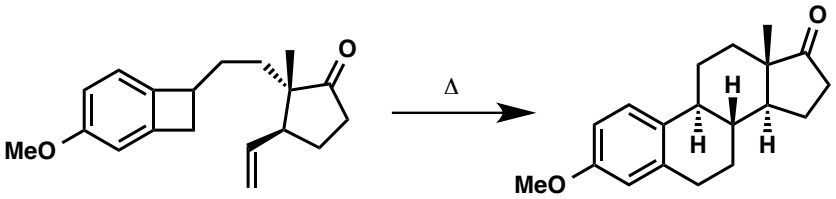
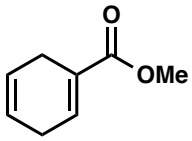


D.



5. Give the reagents reagents necessary to synthesize these compounds using a Diels-Alder Reaction.

A.



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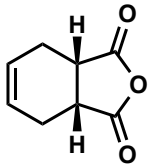

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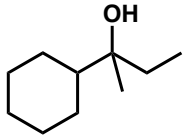

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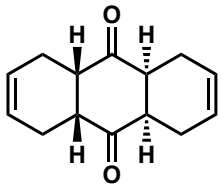
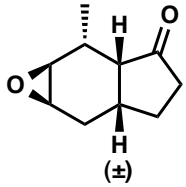


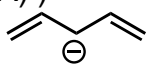
E.

6. Synthesize the following product using reasonable starting materials of 4 carbons or less.



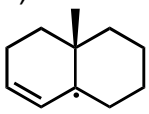
7. Draw the major contributing resonance structures for the following compounds.

A))

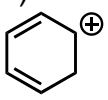


B)

C)

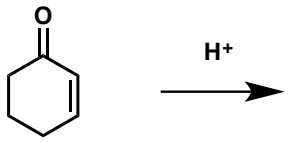


D)

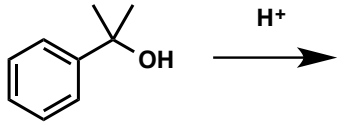


8. Draw the resonance stabilization for the charged intermediates formed in the following reactions.

A.



B.



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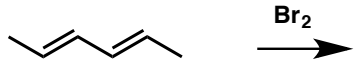
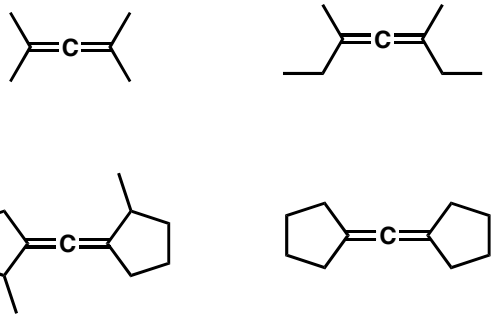
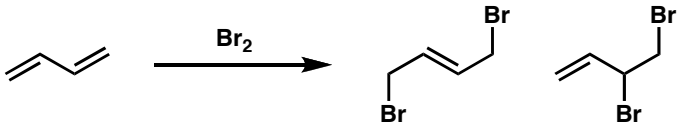
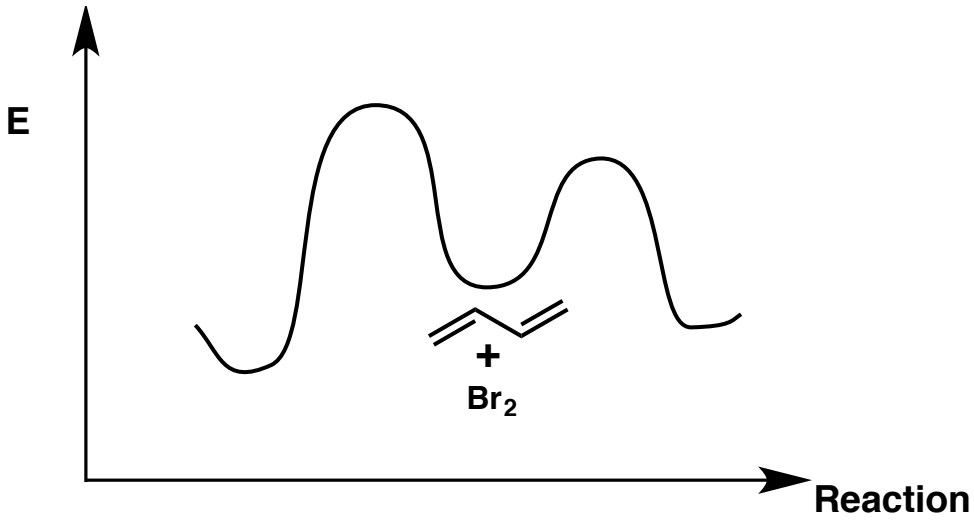


9. Circle which of these compounds are chiral.



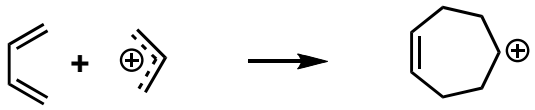
10. For the reaction below, place the appropriate structures for intermediates and products on the provided energy/reaction coordinate plot. Label the thermodynamic product and the kinetic product of the reaction. (30 points)



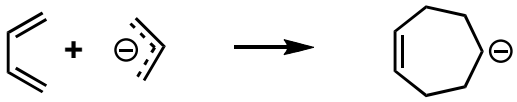


11. For these two reactions of allyl systems that are related to the Diels-Alder cycloaddition reaction, use a HOMO/LUMO molecular orbital analysis to show whether or not the reaction will be successful under thermal conditions. That is, can either of these reactions work according to orbital symmetry?

A)



B)



12. Why does this equilibrium favor the compound on the right?