

OC2 Practice 2-1

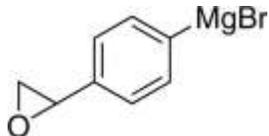
Name _____

Date _____

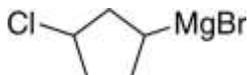
Multiple Choice

_____ 1. Which of the following is a feasible Grignard reagent?

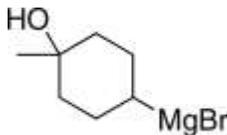
a.



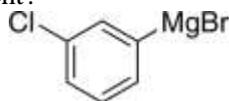
b.



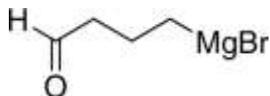
c.



d.

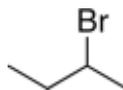


e.

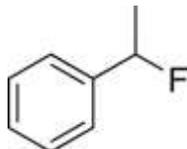


_____ 2. Which of the following alkyl halides could be used to generate a Wittig reagent?

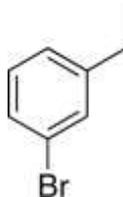
a.



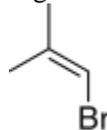
b.



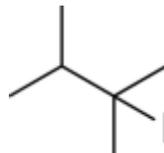
c.



d.



e.



_____ 3. Which nucleophile would you expect to add reversibly to an alpha,beta-unsaturated carbonyl?

a. NaBH_4

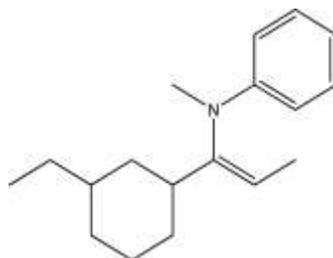
b. CH_3Li

c. $\text{CH}_3(\text{CH}_2)_3\text{MgBr}$

d. NaCN

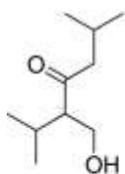
e. LiAlH_4

___ 4. Which of the following functional groups is present in the following compound?

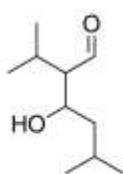


- a. amine
- b. imine
- c. enamine
- d. amide
- e. acetal

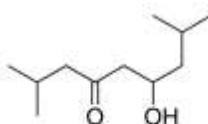
___ 5. What is the product for the following aldol reaction?



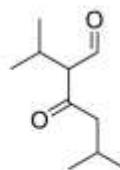
I



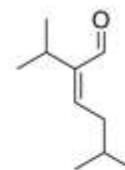
II



III



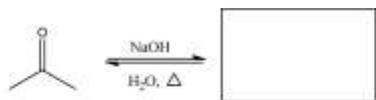
IV



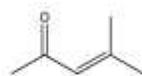
V

- a. I
- b. II
- c. III
- d. IV
- e. V

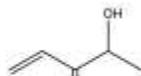
___ 6. What is the aldol condensation product for the following reaction?



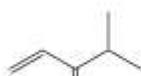
I



II



III



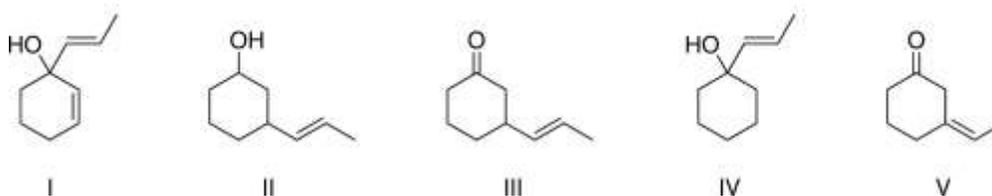
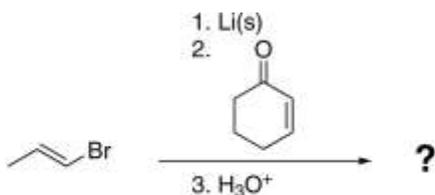
IV



V

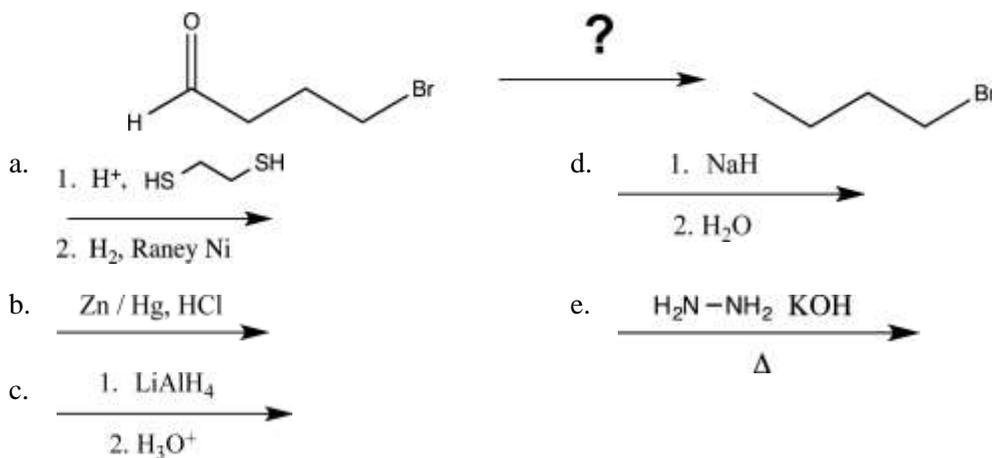
- a. I
- b. II
- c. III
- d. IV
- e. V

___ 7. What is the product of the following reaction sequence?

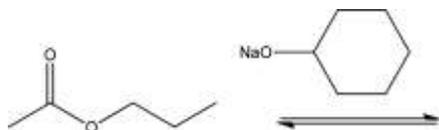


- a. I
b. II
c. III
d. IV
e. V

___ 8. Which of the following reagents would be the best choice to carry out the following synthetic step?



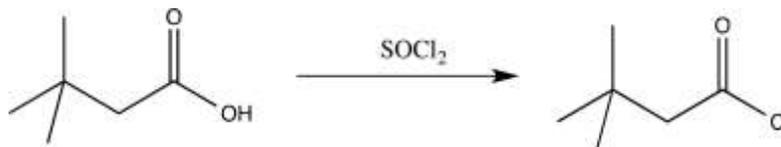
___ 9. What is true about the free energy diagram for the following reaction?



- a. The first step of this reaction is the rate-determining step.
b. The free energy diagram for this reaction has three different transition states.
c. The overall products for this reaction include a carboxylic acid.
d. The first step of this reaction is exothermic.
e. The second step of this reaction is irreversible.

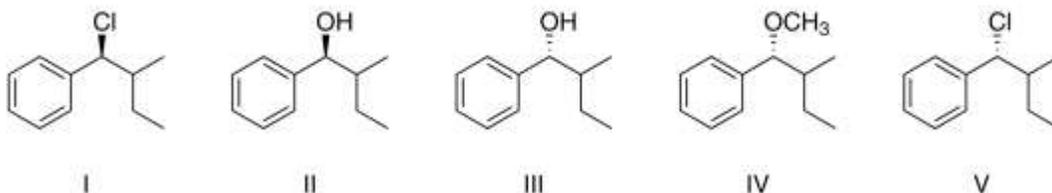
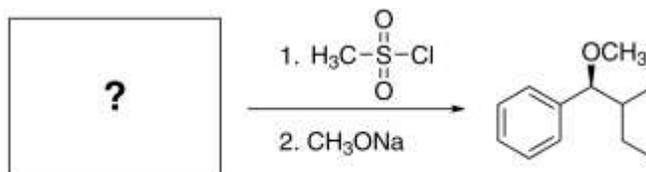
- a. I
- b. II
- c. III
- d. IV
- e. Both I and II work to complete this reaction.

___ 13. What is the major driving force for the following reaction?



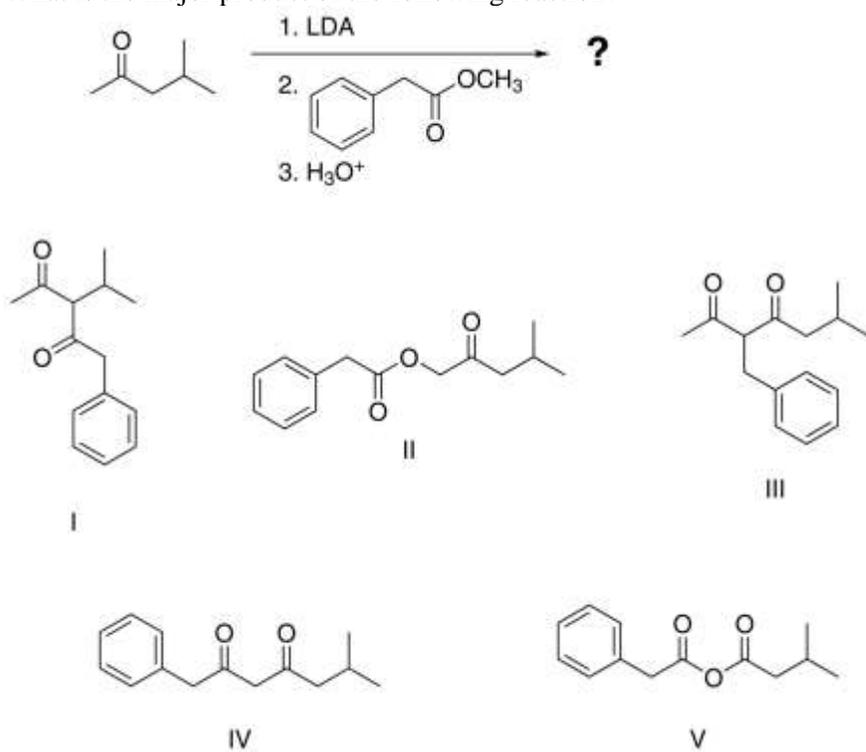
- a. The product, an acid chloride, is more thermodynamically stable than a carboxylic acid.
- b. Chloride is a better nucleophile than hydroxide.
- c. The reaction is highly exothermic.
- d. Hydroxide is a better leaving group than chloride.
- e. The byproducts SO_2 and HCl bubble out of solution irreversibly.

___ 14. What is the starting material of the following reaction sequence?



- a. I
- b. II
- c. III
- d. IV
- e. V

15. What is the major product of the following reaction?

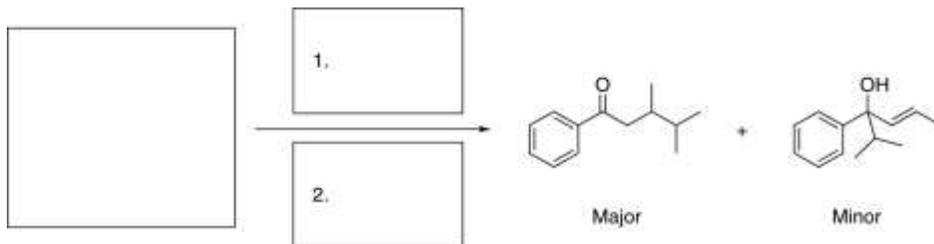


- a. I
b. II
c. III

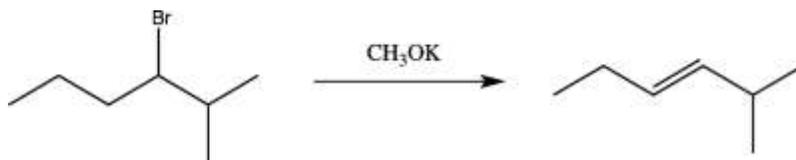
- d. IV
e. V

Short Answer

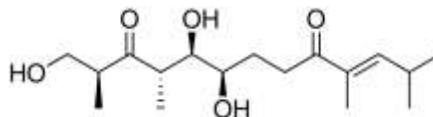
1. A reaction was carried out, and the two products shown below were obtained. Fill in the boxes with the starting material and the reagents that were used, and then draw a mechanism for the formation of the major product.



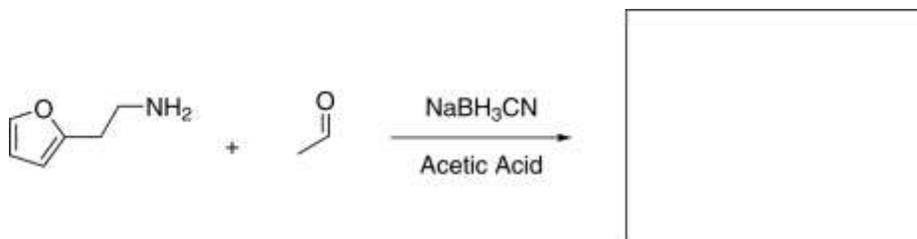
2. A student proposes the following synthetic step. Briefly explain the problem with this proposed reaction, and suggest an alternative way to synthesize the target molecule using 1-bromopropane and any other necessary reagents.



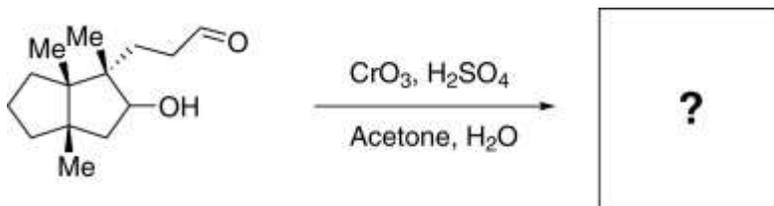
3. Determine which bonds in the compound below could be synthesized using an aldol reaction or aldol condensation.



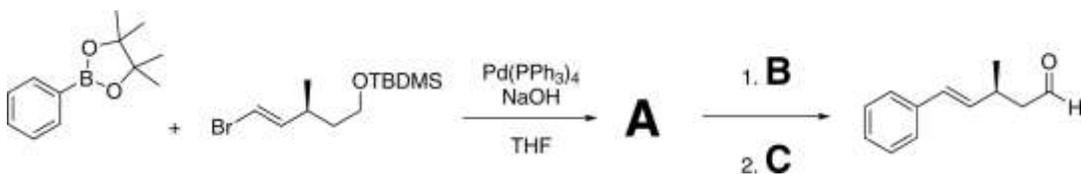
4. What is the product of the following reaction?



5. Predict the product of the following reaction.



6. Fill in the missing reagents and intermediates to complete the following synthetic scheme.



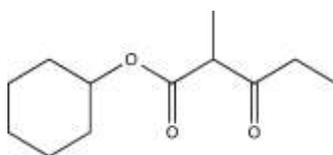
7. Draw a detailed free energy diagram for the following transesterification reaction. Include and label the overall reactants, the overall products, the intermediate(s), the axis, and the transition state(s).



8. Draw a complete, detailed mechanism for the following reaction and predict the product(s).



9. Show how the following compound can be synthesized using a Claisen condensation. Include all necessary reagents.



10. Will the peptide coupling proceed to afford a single dipeptide as intended? Explain.

