



THE UNIVERSITY OF  
**TOLEDO**  
1872

## **CHEM 8410\_6410\_4410 – Organic Synthesis**

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### **CHEM 8410\_6410\_4410 Spring 2019 – Mid-Term Exam 1 02-14-19 (Rescheduled due to inclement weather)**

**Time: 10:00 am – 11:15 am**

**Student Name:** \_\_\_\_\_

**Student Number:** \_\_\_\_\_

<b>Instructor:</b>	Prof. Andreana
<b>Room #:</b>	BO 2059



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## CHEM 8410\_6410\_4410 – Organic Synthesis

### Mid-Term Exam 1

Time: 10:00 am – 11:15 am  
Date: February 12, 2019  
Room: BO 2059

100 Points - Total

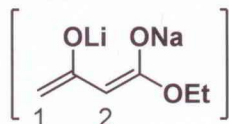
1. **Problem 1:** Please provide mechanisms for 5 of the following 10 named reactions: **(25 Points)** - \* indicates this named reaction **MUST** be one of your 5.

- |                              |                                     |
|------------------------------|-------------------------------------|
| 1. Arbuzov Reaction          | *6. Biginelli Reaction              |
| 2. Baeyer Villiger Reaction  | 7. Bishler-Mohrlau Indole Synthesis |
| 3. Bamford-Stephens Reaction | 8. Bernthsen Acridine Synthesis     |
| 4. Barton Reaction           | 9. Bergman Reaction                 |
| 5. Baudisch Reaction         | *10. Barbier Reactions              |

Answers:

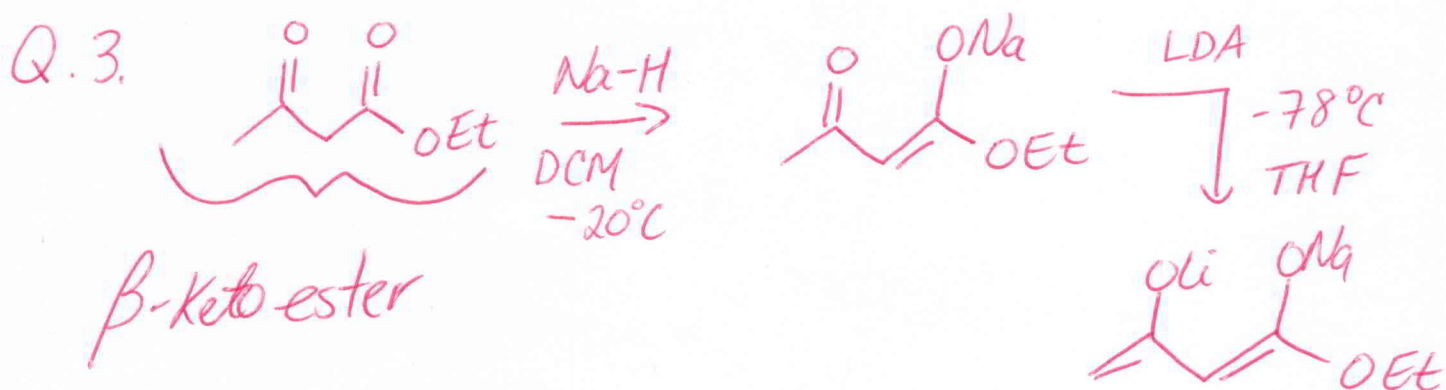
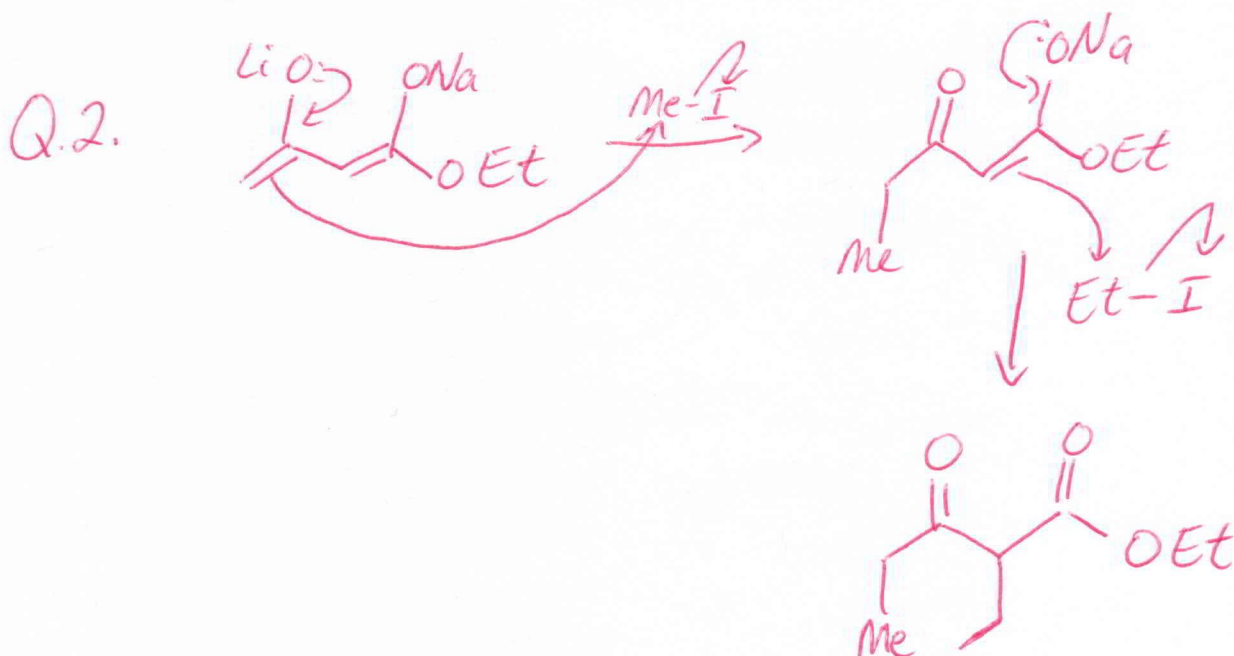
PLEASE REFER TO YOUR  
NOTES.

**Problem 2:** Below is an intermediate we discussed in class. Which carbon reacts first, 1 or 2? Illustrate your answer by performing a double alkylation using MeI and EtI as your two electrophiles. Show how you would form the intermediate from a  $\beta$ -keto ester. (15 Points)



Answers:

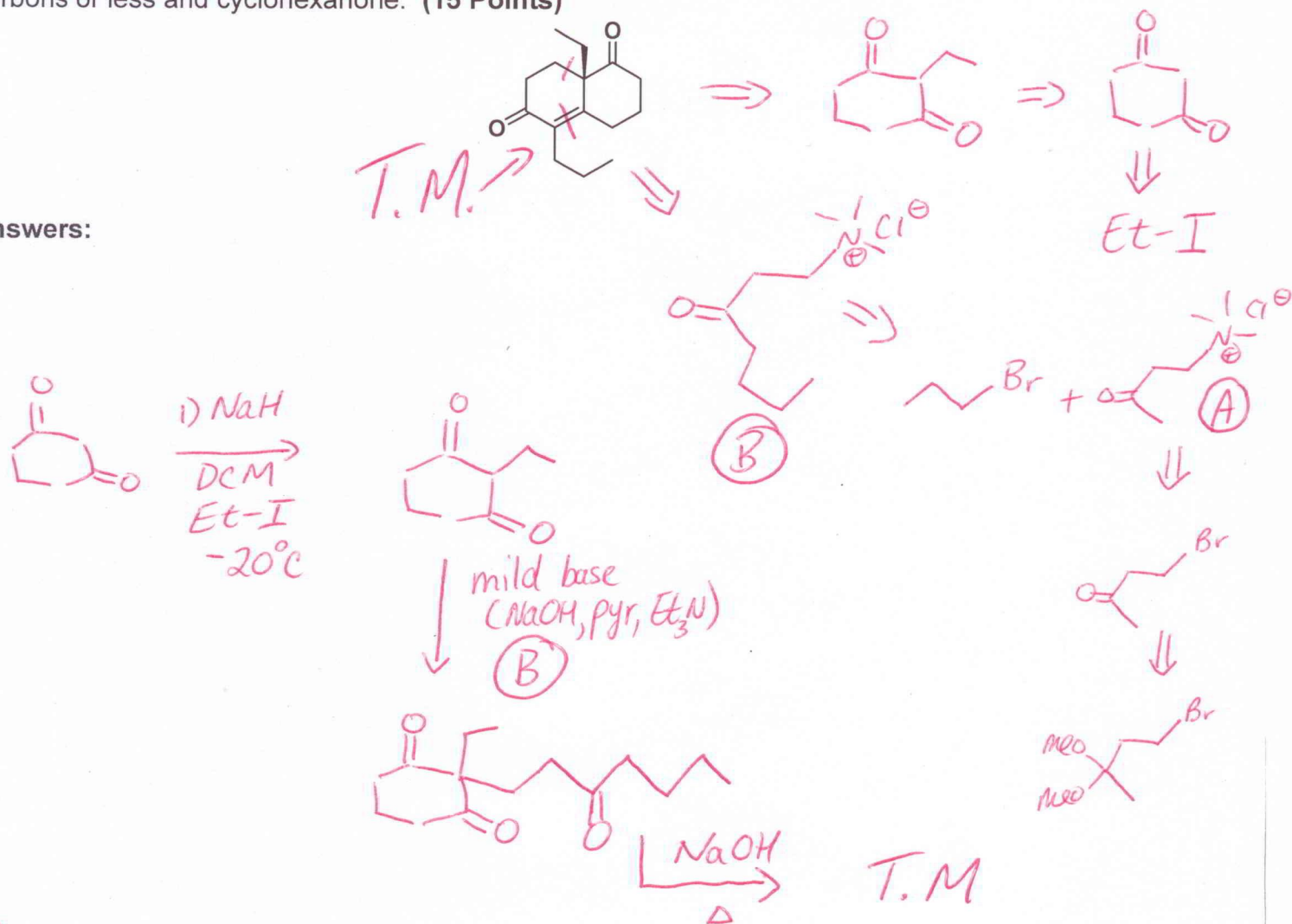
Q.1 Carbon ① reacts first.



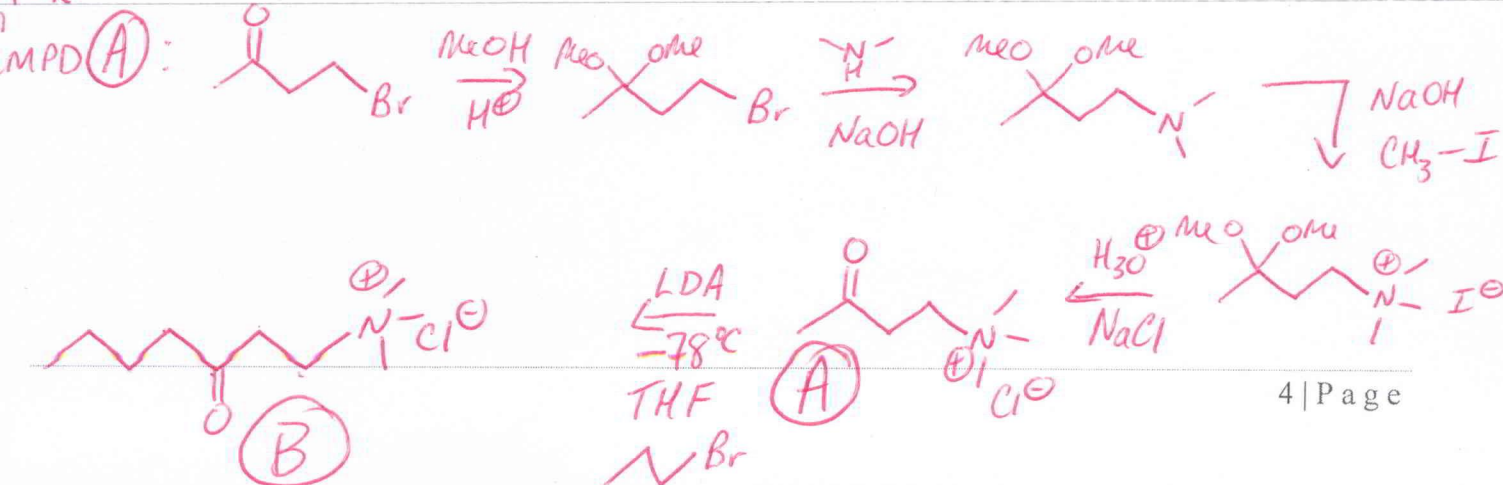


**Problem 3.** Please prepare the compound noted below from starting materials that contain four carbons or less and cyclohexanone. (15 Points)

Answers:



For



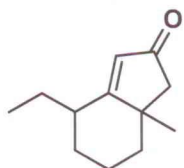




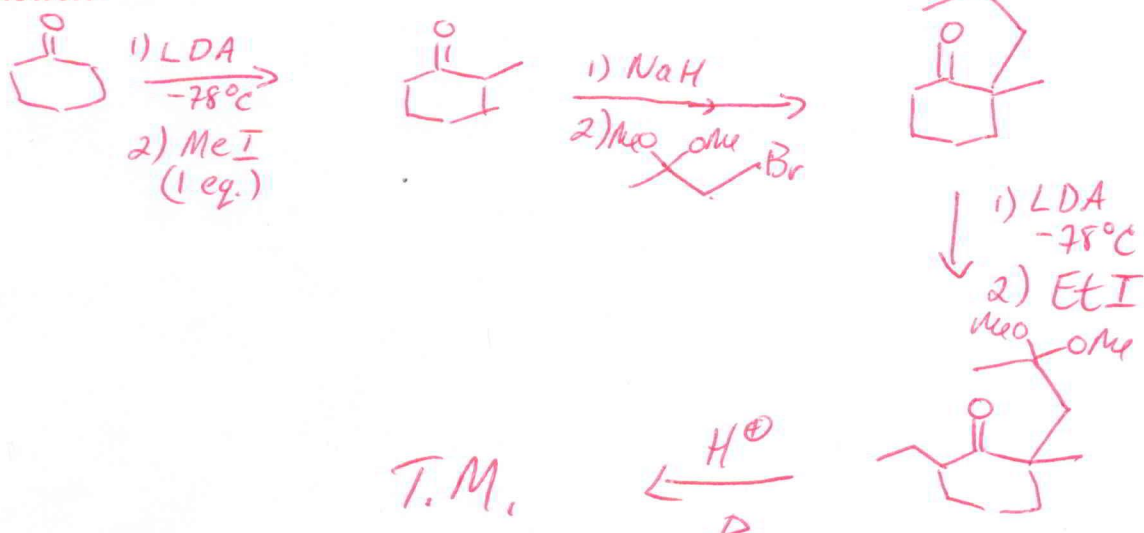
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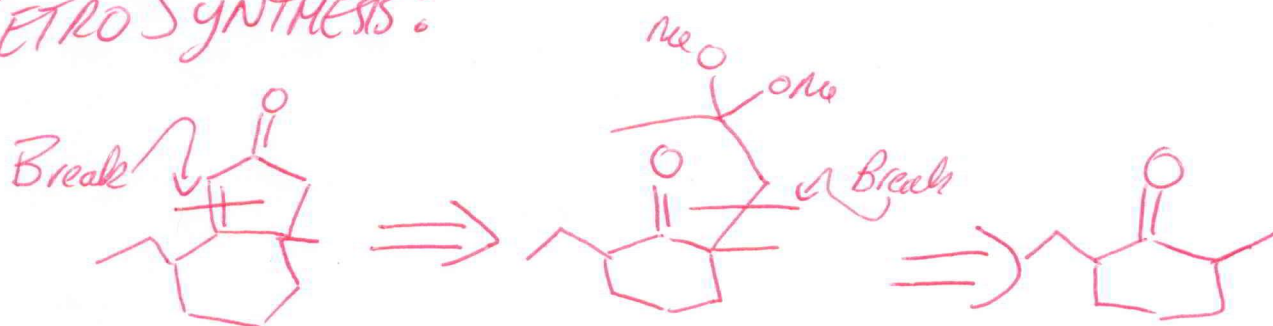
**Problem 4:** Show how you would synthesize the following molecule. Use retro-synthetic analysis to break the pertinent bonds. Provide mechanisms for every step you use. As a hint, start with cyclohexanone and some other compound of your choice (From Quiz #1). (25 Points)



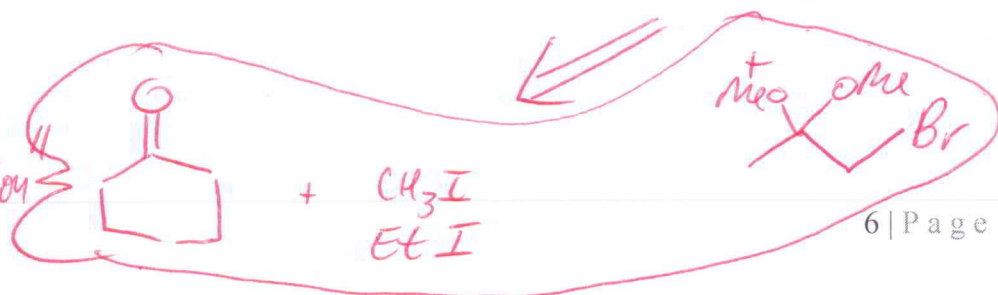
Answer:



RETROSYNTHESIS:



But see above for "order of addition"





**ANSWER:**

