

## **EXAM #4 MORE PROBLEMS**

### **DO THESE PROBLEMS BEFORE THE OTHER SET OF EXTRA PROBLEMS!**

(they are more relevant to the exam material)

#### **What to expect on Exam #4:**

1.  $pK_a$ s of ketones, diketones, esters, etc.
2. ~3 Transformations – supply missing reagents
3. ~10 Transformations – supply missing product
4. ~2 Mechanisms
5. ~2 Synthesis

#### **What NOT to expect on Exam #4:**

1. Determine mechanism by crossover and stereochemical experiments (end of Friday's lecture)
2. Neighboring Group Participation – **Do not work through problems #8, 24 & 25 on the Extra Problem Set.**

1. Please provide detailed mechanism for the following transformation. Show all arrow pushing.

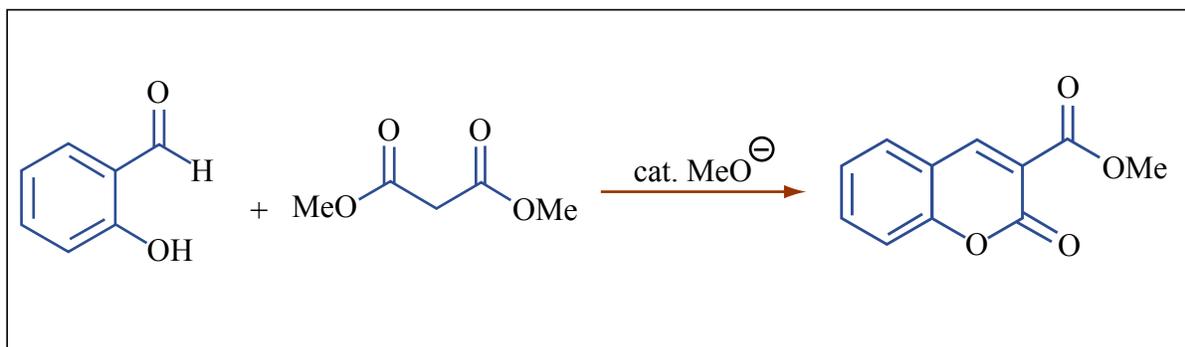


Figure by MIT OCW.

2. (10 points) Please provide a detailed mechanism for the following transformation. Show all arrow pushing.

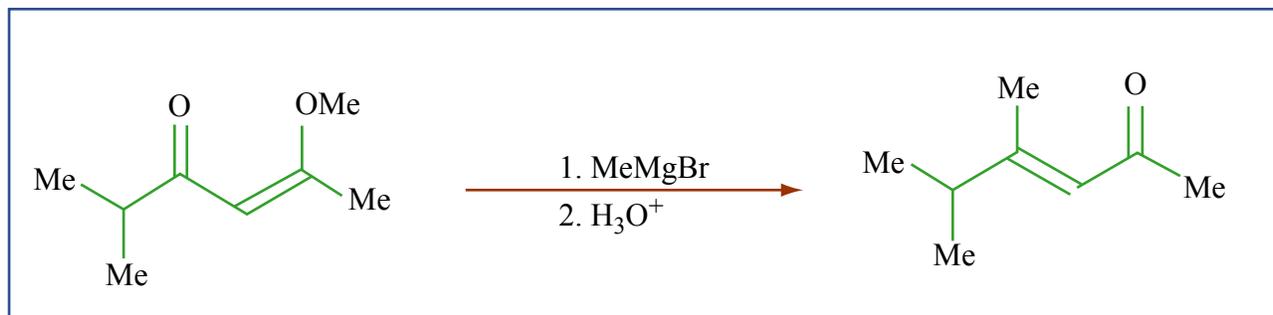


Figure by MIT OCW.

3. (10 points) Please provide a detailed mechanism for the following transformation. Show all arrow pushing. Hint: This mechanism is from problem set 6.

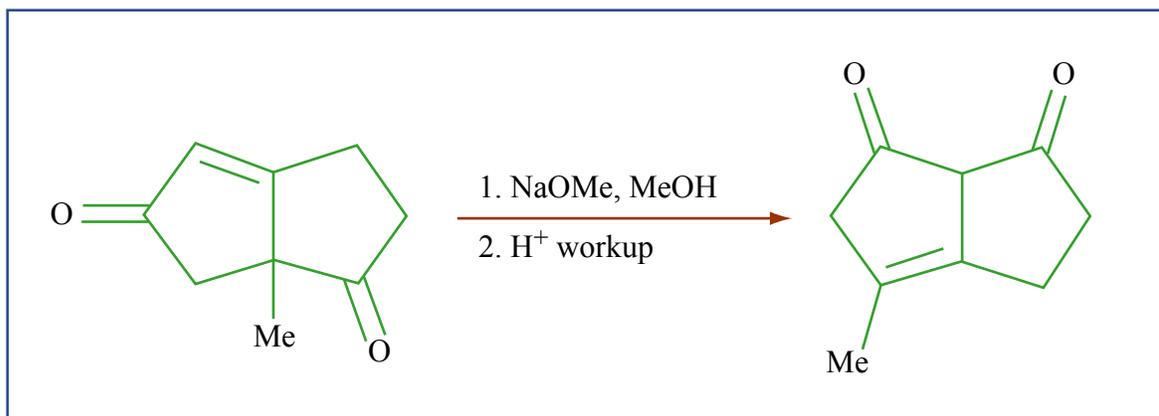


Figure by MIT OCW.

4. (10 points) Diastereomers **A** and **B** provide different products upon diazotization. Please explain why only one product is formed selectively in each relation. Your explanation should include a **3-dimensional** mechanism for the formation of each product from the corresponding diazonium salt.

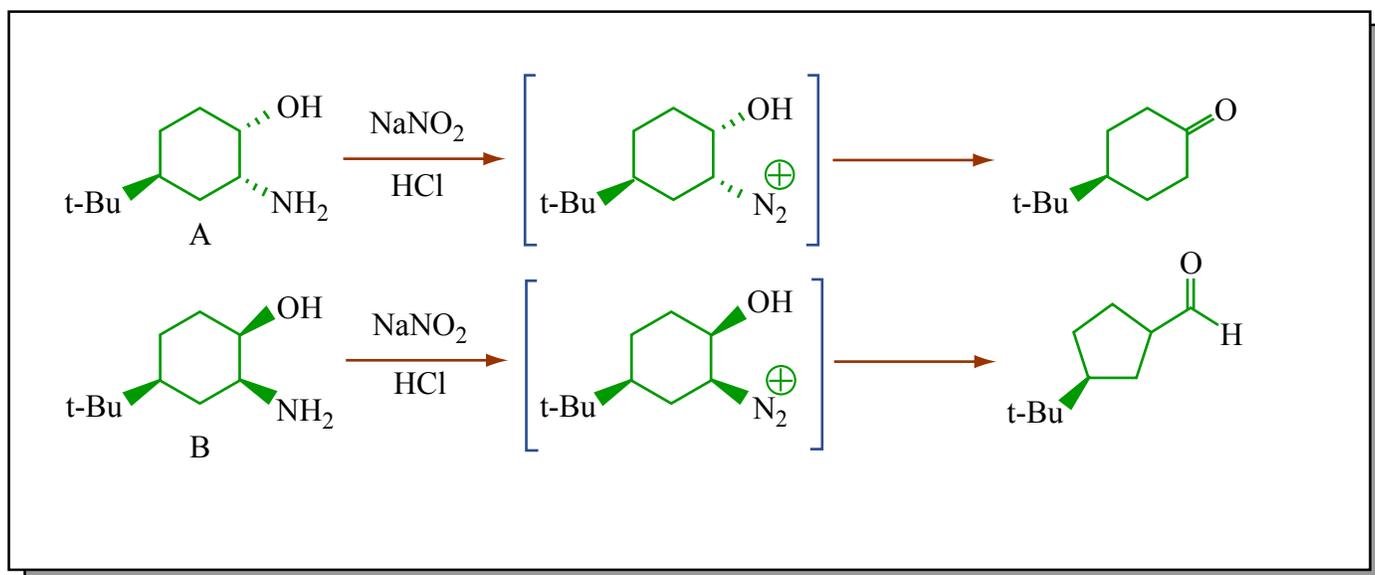


Figure by MIT OCW.

5. Please provide a detailed mechanism for the following transformation. Show all arrow pushing.

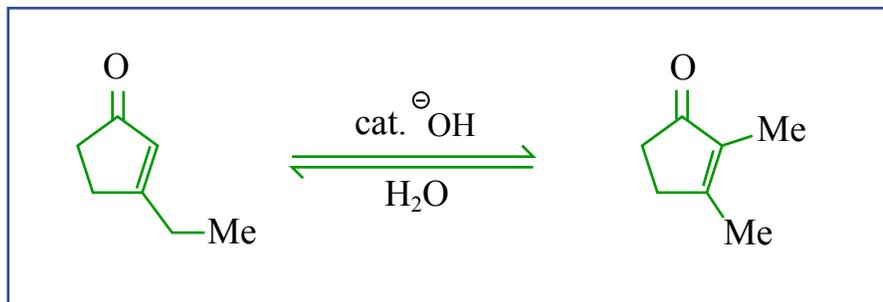


Figure by MIT OCW.

6. Please provide a detailed mechanism for the following transformation. Show all arrow pushing.

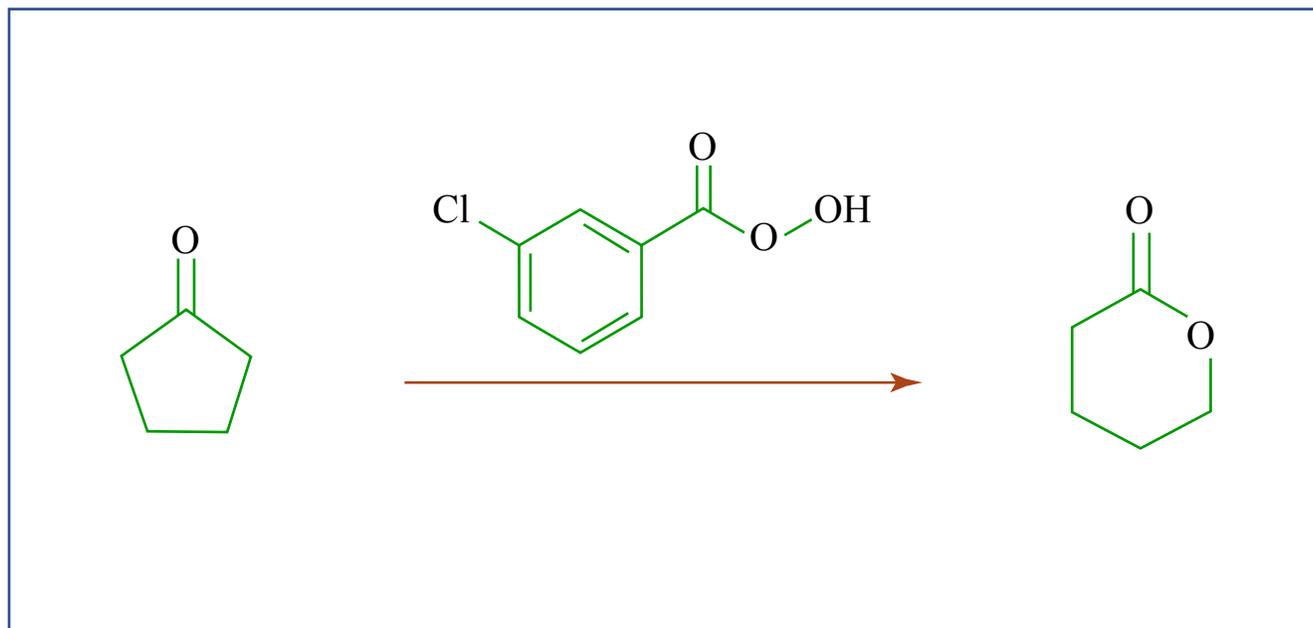


Figure by MIT OCW.

7. Please provide a synthesis of the indicated compound. All of the carbon atoms should be derived from methyl acetate.

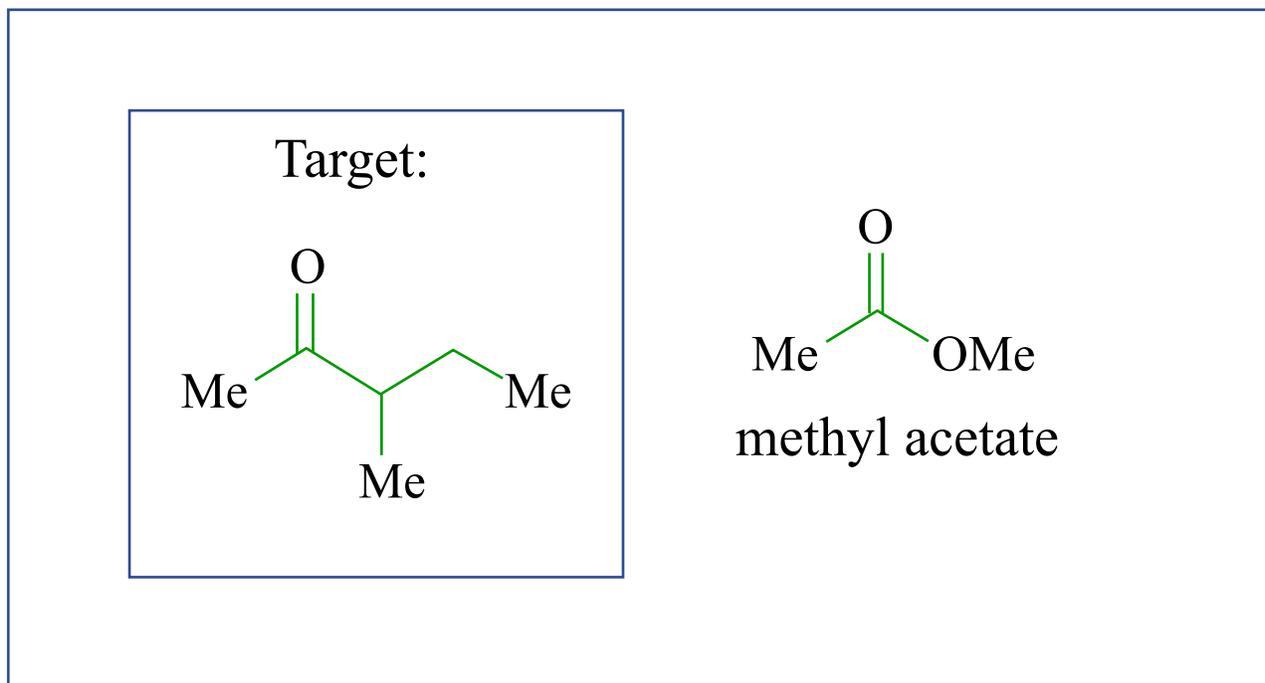


Figure by MIT OCW.

8. Please provide a synthesis of the indicated compound. All of the carbon atoms should be derived from isopropanol.

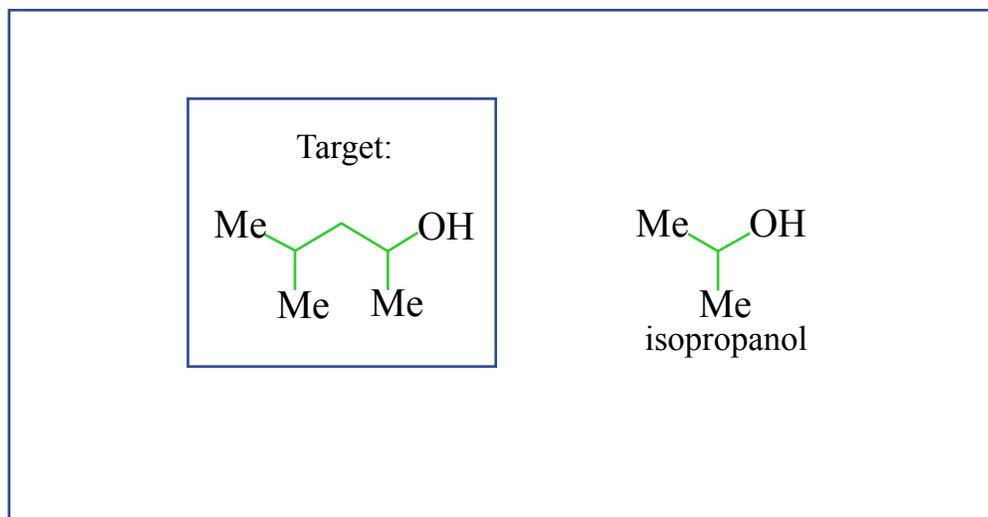


Figure by MIT OCW.

9. (12 points) Please provide a synthesis of the indicated compound. All of the carbon atoms should be derived from **methyl acetate**. You will receive partial credit for a complete retrosynthesis.

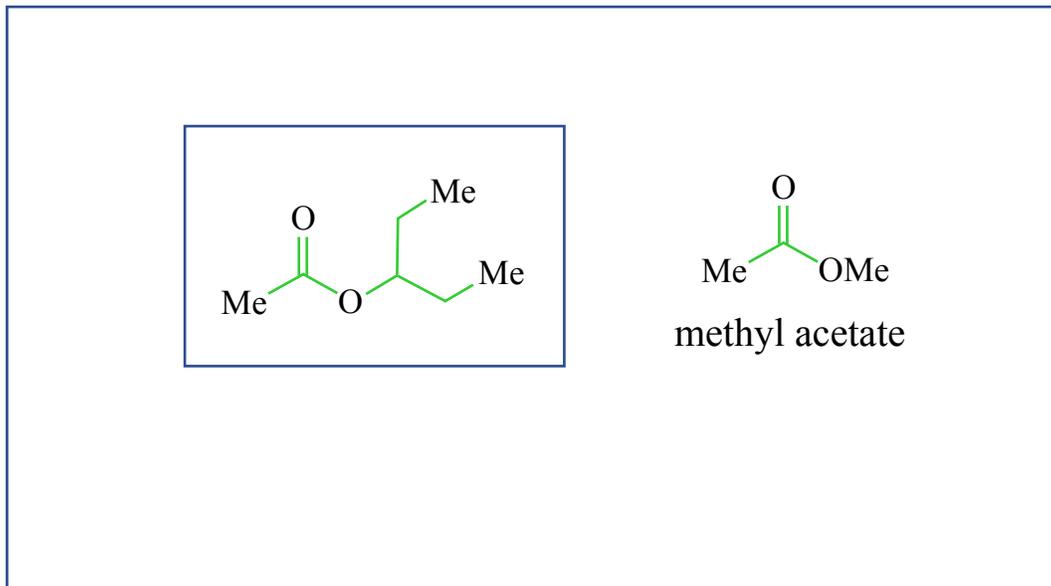
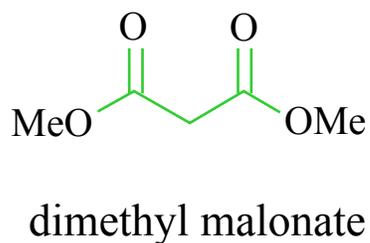
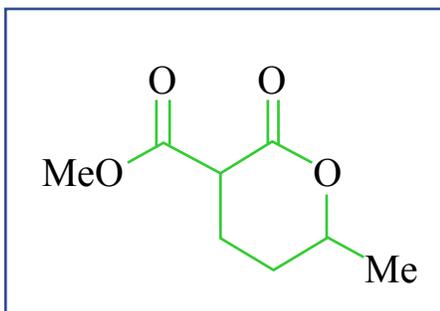


Figure by MIT OCW.

10. (12 points) Please provide a synthesis of the indicated compound. All of the carbon atoms should be derived from **dimethyl malonate** and **alcohols containing three or fewer carbons**. You will receive partial credit for a complete retrosynthesis.



R-OH  
alcohols containing  
three or fewer carbons

Figure by MIT OCW.