



THE UNIVERSITY OF  
**TOLEDO**  
1872

## CHEM 8410\_6410\_4410 – Organic Synthesis

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### CHEM 8410\_6410\_4410 Spring 2018 – Mid-Term Exam 3 04-17-18

**Time: 10:00am – 11:15am**

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

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

<b>Instructor:</b> Prof. Andreana
<b>Room #:</b> FH 2030



## CHEM 8410\_6410\_4410 – Organic Synthesis

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### Mid-Term Exam 3

**Time: 10:00 am – 11:15 am**  
**Date: April 17, 2018**  
**Room: FH 2030**

**100 Points - Total**

1. **Problem:** Please provide mechanisms for 5 of the following 10 named reactions: **(25 PTS)**

Heck Reaction

Hell-Volhard-Zelinsky Reaction

Eschenmoser Fragmentation

Jacobsen Epoxidation

Fischer Indole Synthesis

Finkelstein Reaction

Friedel-Crafts Acylation

Hofmann Reaction

Gabriel Synthesis

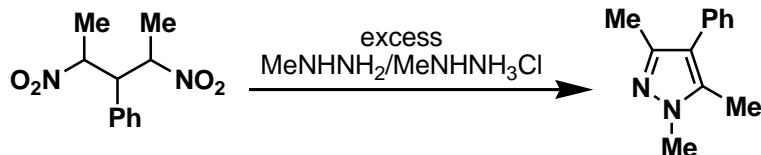
Harries Ozonide Reaction

**Answer(s):**

Use back of sheet if needed and blank paper →→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→



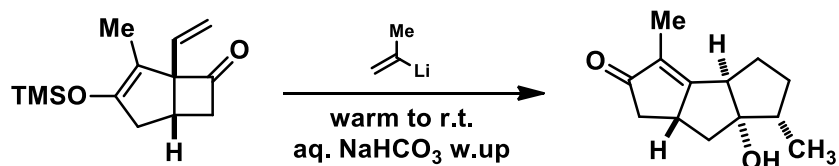
2. **Problem:** We've been focused on Charged Affinity Patterns recently in class. Here is a good exercise that deals with the versatility of the nitro group. Provide a detailed mechanism for the following reaction. (10 PTS)



**Answer:**



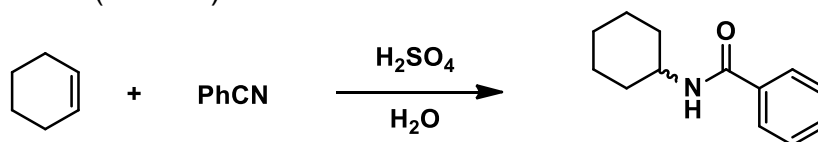
3. **Problem:** Provide the mechanism for the following transformation in great detail. Hint: An 8 membered ring forms as an intermediate. (20 PTS)



**Answer:**



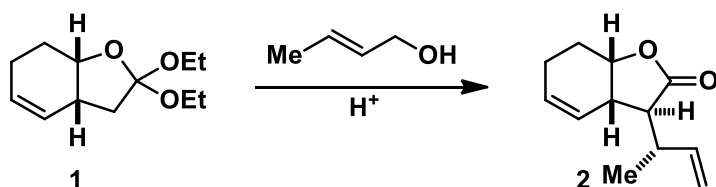
4. **Problem:** Using the curved arrow formalism, provide a reasonable mechanism for the following reaction. (10 PTS)



**Answer:**



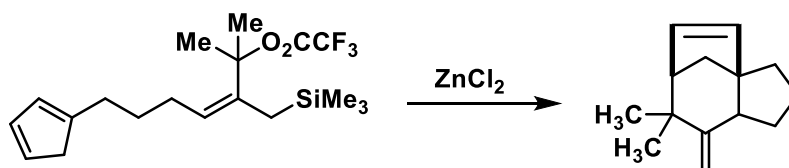
5. **Problem:** When treated with 2-butene-1-ol in the presence of an acid catalyst, **1** is stereoselectively transformed into lactone **2** (Kozlowski, *JOC* **1987**, 52, 3541). Provide a mechanism for the transformation below. In your mechanism, you **are not** required to deal with the issue of stereochemistry. (15 PTS)



**Answer:**



6. **Problem:** Provide a step-by-step mechanism for the following transformation. What is the significance of installing the TMS group at the terminal end? Based on that question, what is the effect called? (20 PTS)



**Answer:**