

# Greenberg Final Pilot Review

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12/11/2025

# Things You Should Know!

- Exam 1:
  - MO Theory
  - VB Theory
  - Acid/Base
  - Representations of structures
  - Stereochemistry
- Exam 2:
  - Aromaticity
  - Alkene reactions
  - Alkyne reactions
  - Substitution reactions
  - Elimination reactions
- Exam 2 (cont.):
  - Reaction coordinate diagrams
  - Reaction mechanisms
- Post Exam 2 Content:
  - Other types of reactions
  - Spectroscopic methods
  - UV-vis
  - Mass spec.
  - IR
  - H/C NMR

# This is NOT content review!

- For content review:
  - OCI: <https://bit.ly/ocijhu>
  - PILOT: <https://jhu-orgo-pilot.github.io/FA25-Orgo-Greenberg/index.html>
    - Go to resources
  - Textbook!
  - Your notes!

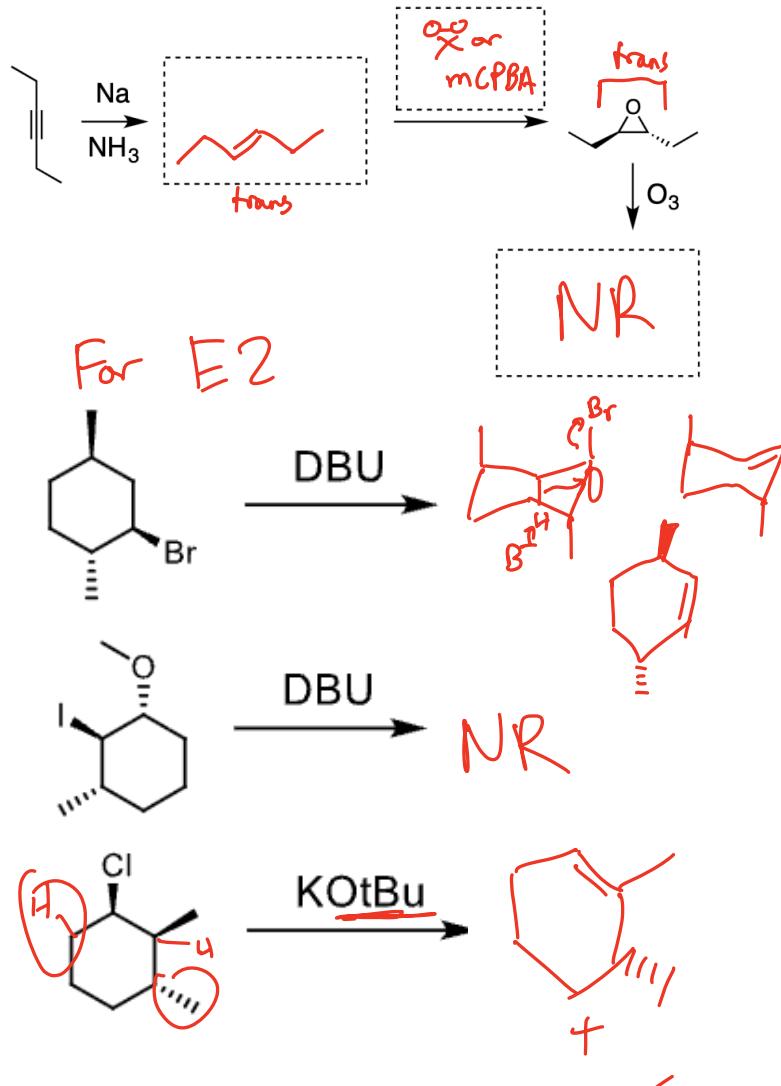
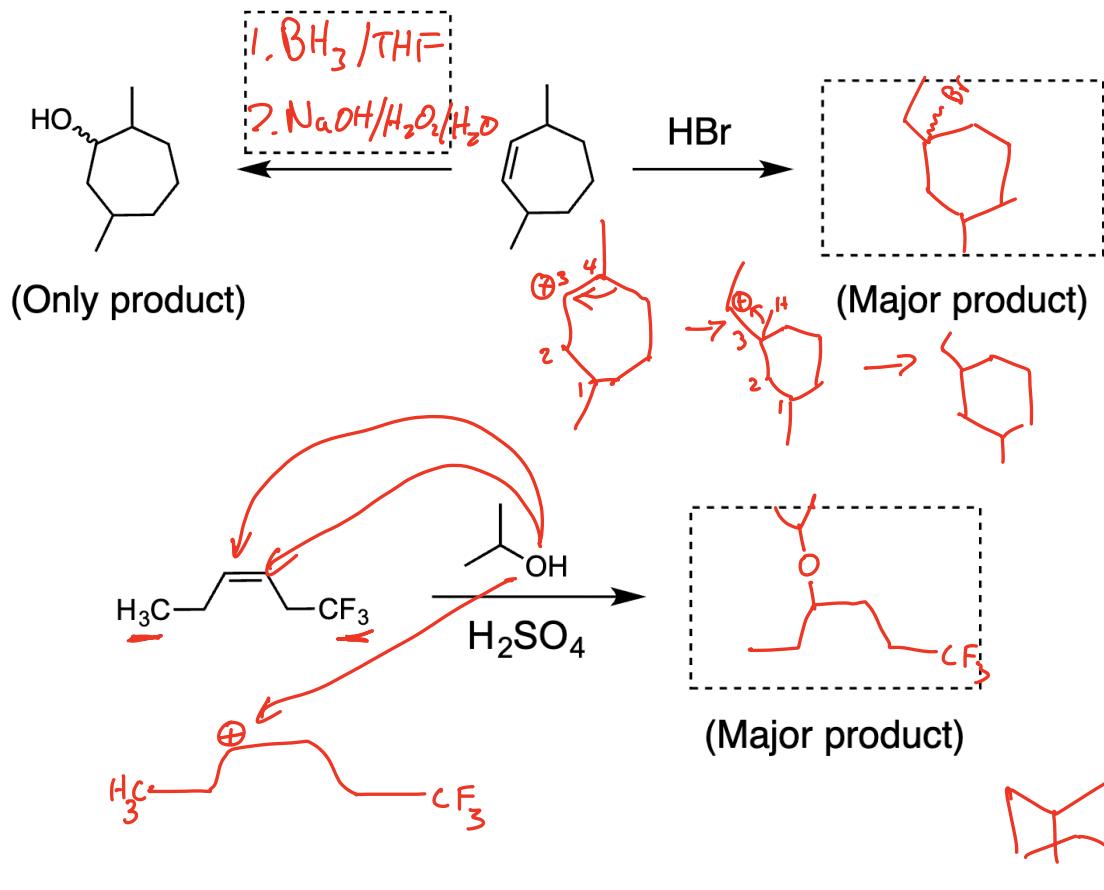
Almost all problems are pulled or adapted from Professor Tovar.

# Tips for Reaction Questions

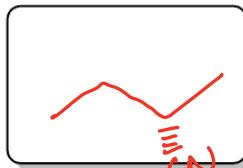
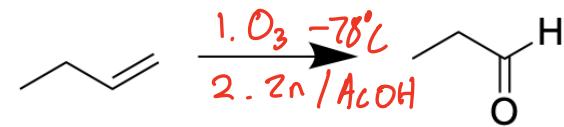
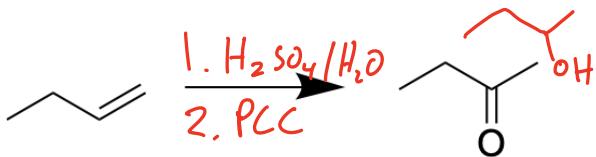
- For every reaction, you should know AT LEAST:
  - What is the product?
  - What are the intermediates?
  - What is the stereochemistry of the products?
  - What is the mechanism (not for all reactions but many)
  - What are the reagents?
  - Know conditions for each reaction (eg. SN1 vs SN2)
  - If I ask: How to turn X into Y? You should be able to tell me

# Reaction Practice 1

No reaction  
possible



# Reaction Practice 2

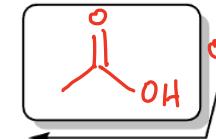
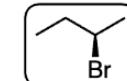


$\xleftarrow[\text{acetone}]{\text{NaCN}}$

$\text{SN}_2$

$\text{Et}_3\text{O}^-$

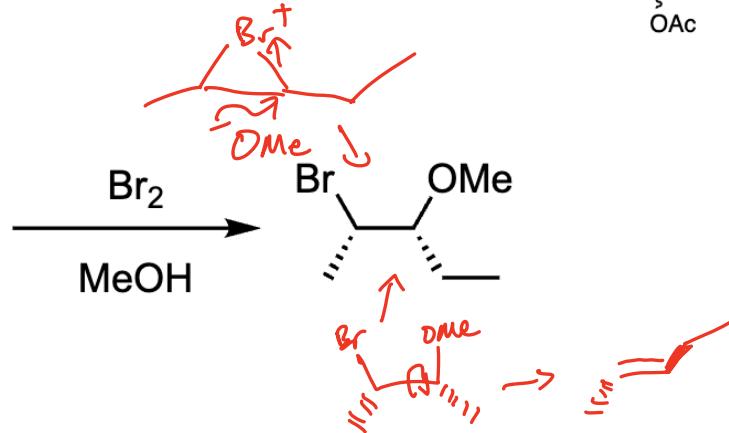
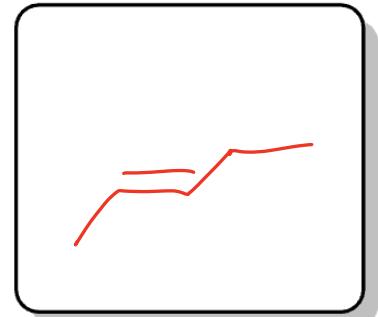
$\text{E2}$



$\xleftarrow{\text{NaOMe}}$  or  $\text{HOAc}$

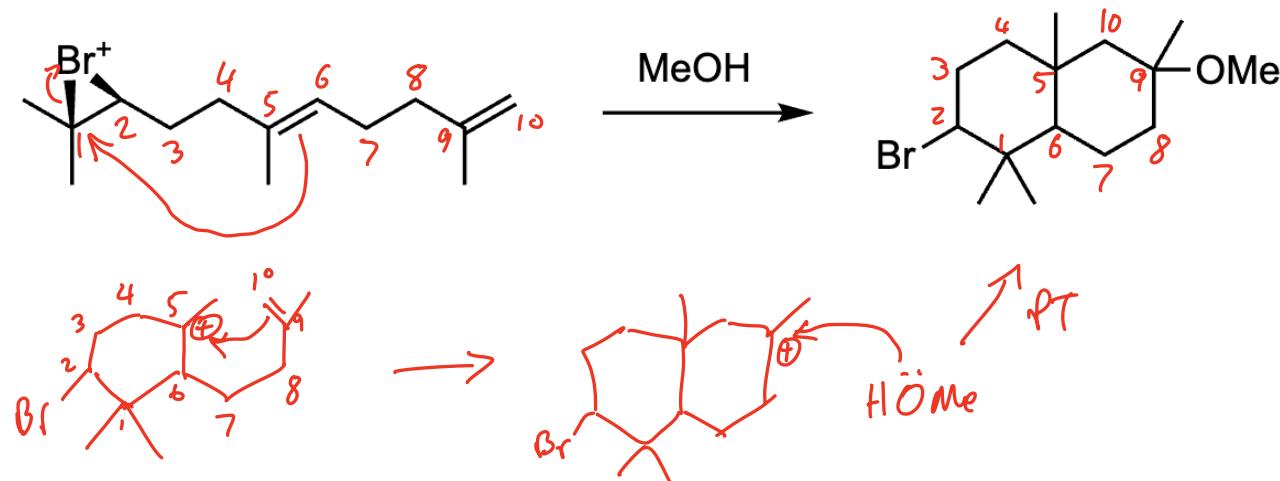
DMSO ( $\text{Me}_2\text{S=O}$ )

$\text{E2}$  or  $\text{SN}_2$



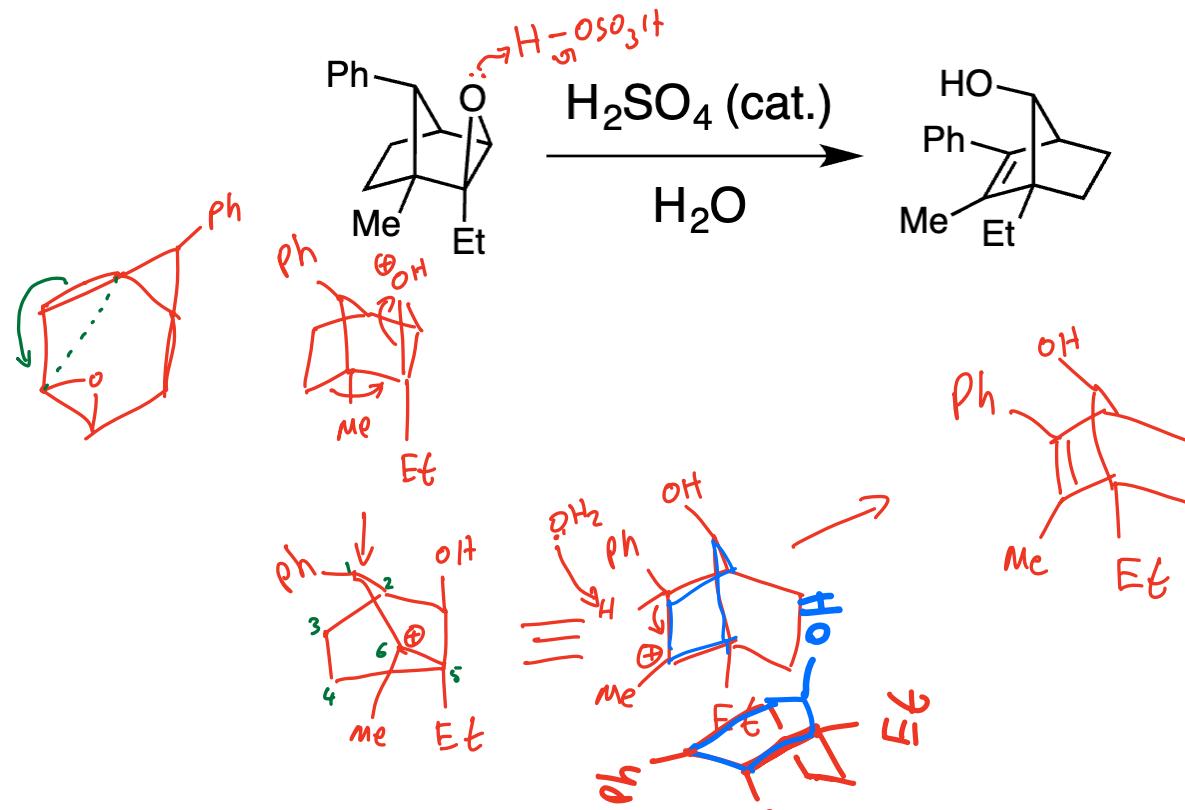
# Reactions Practice 3

- Propose a mechanism for the following terpene rearrangement.



# Reactions Practice 4

- Propose another mechanism.

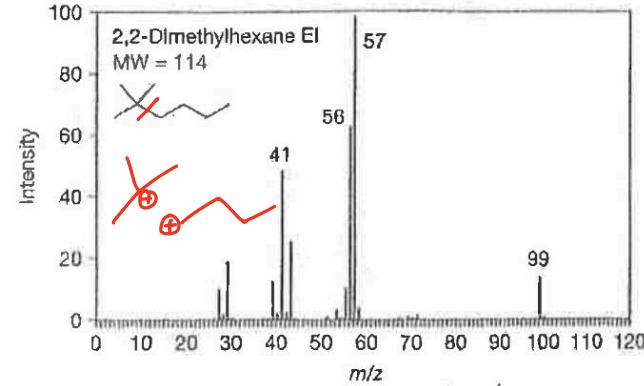
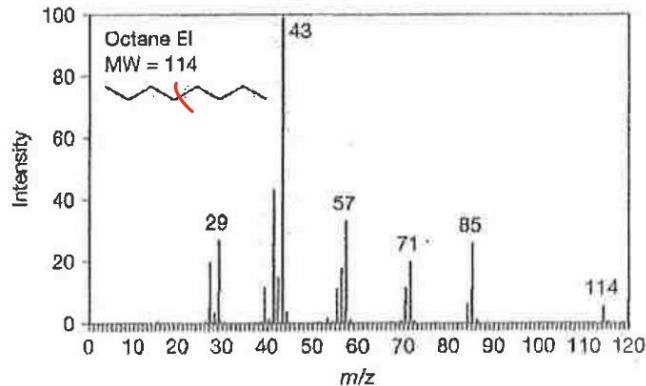


# Tips for Structure Determination

- Calculate degrees of unsaturation
- Draw fragments of the molecule
- Use every spectrum. Sometimes just one is not enough
- Put molecule together based on spectral information

# Mass Spectroscopy

- Draw two possible fragments for the m/z 57 peak for 2,2-dimethylhexane. Then explain why the m/z 57 peak is smaller for octane.



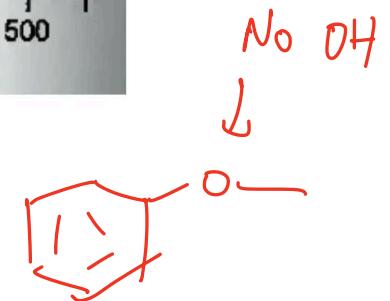
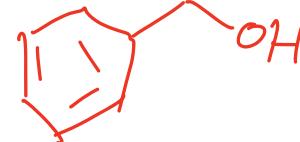
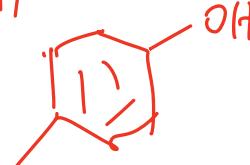
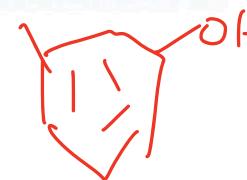
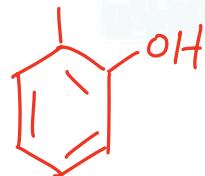
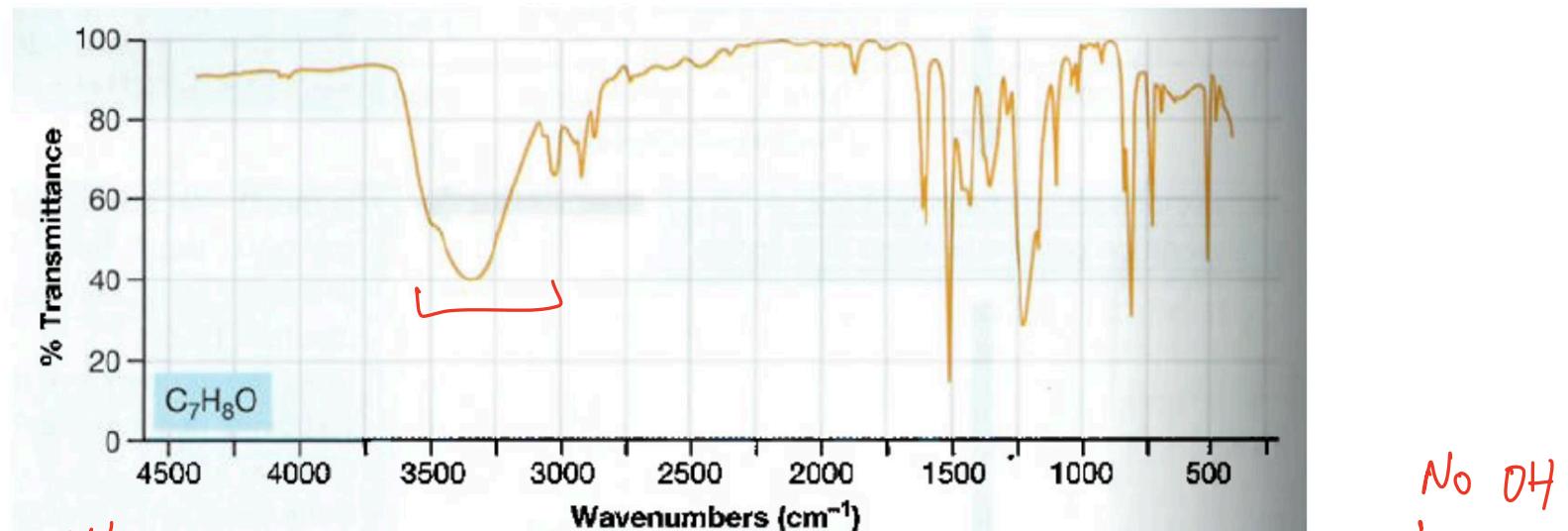
# IR Spectroscopy

- Propose a structure for the following molecule.

$$7 \cdot 2 + 2 - 8$$

$$\frac{1}{2}$$

$$= 4$$



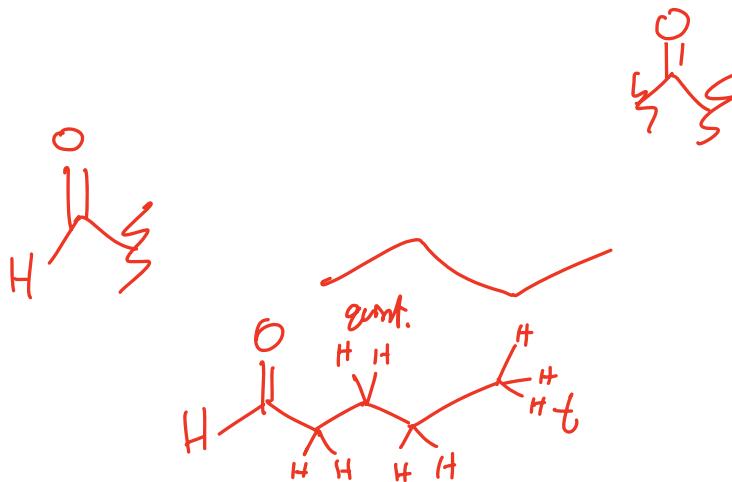
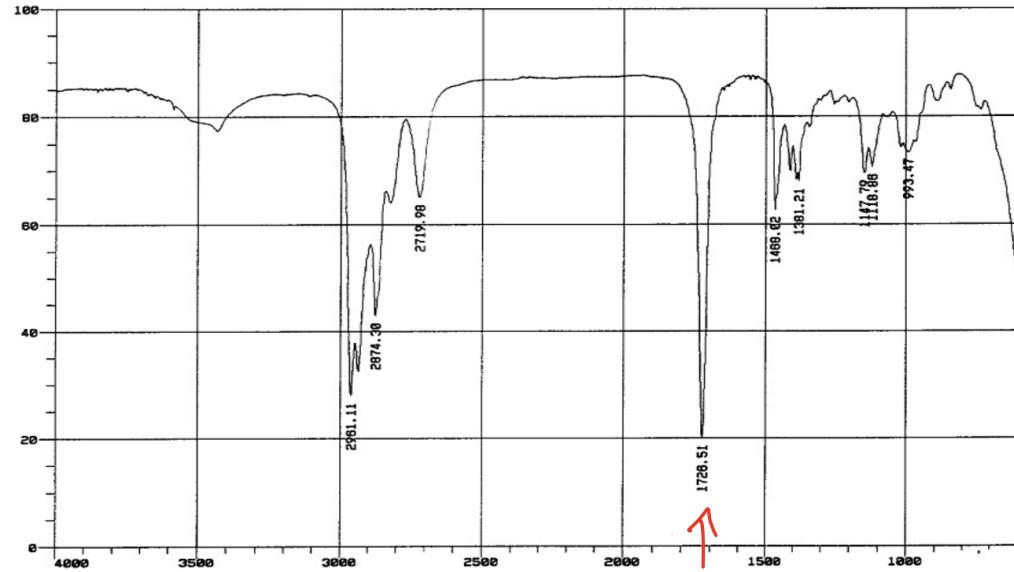
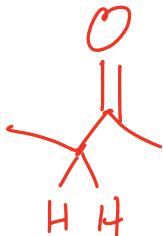
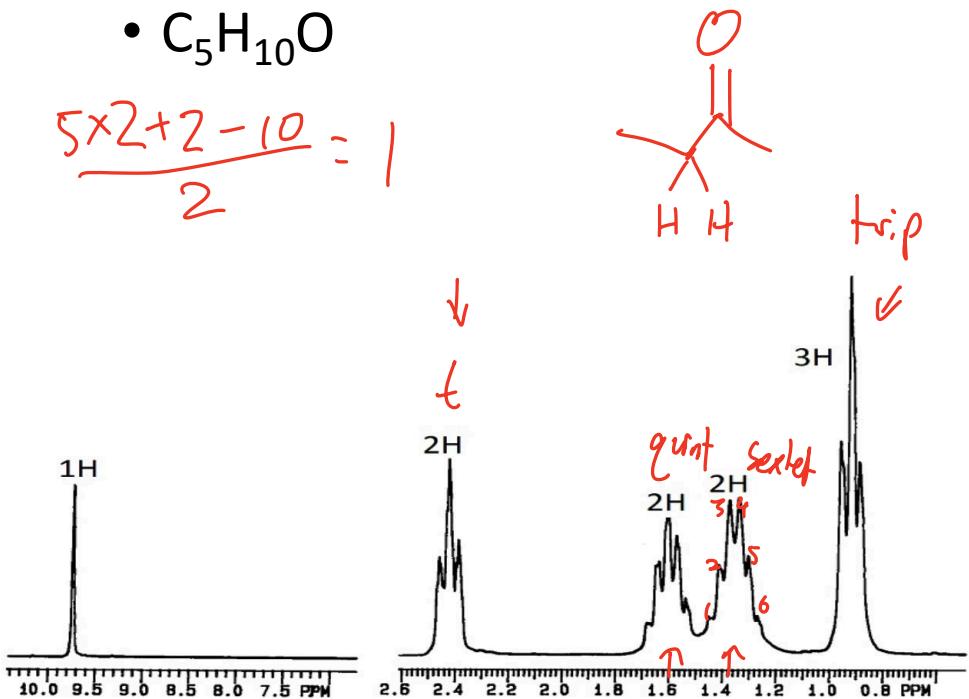
No OH



# Structure Practice 1



$$\frac{5 \times 2 + 2 - 10}{2} = 1$$



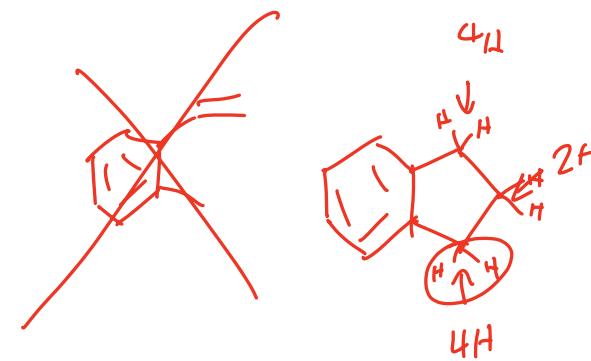
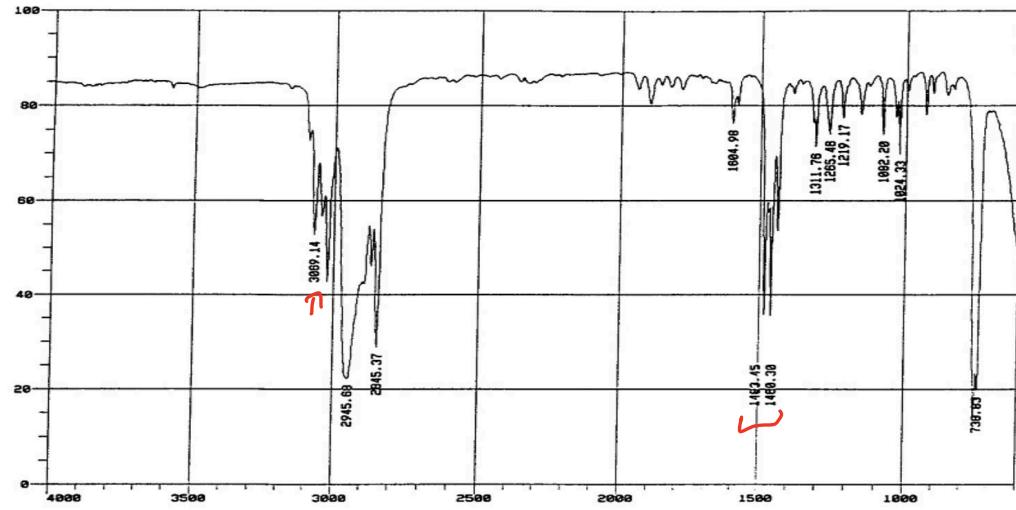
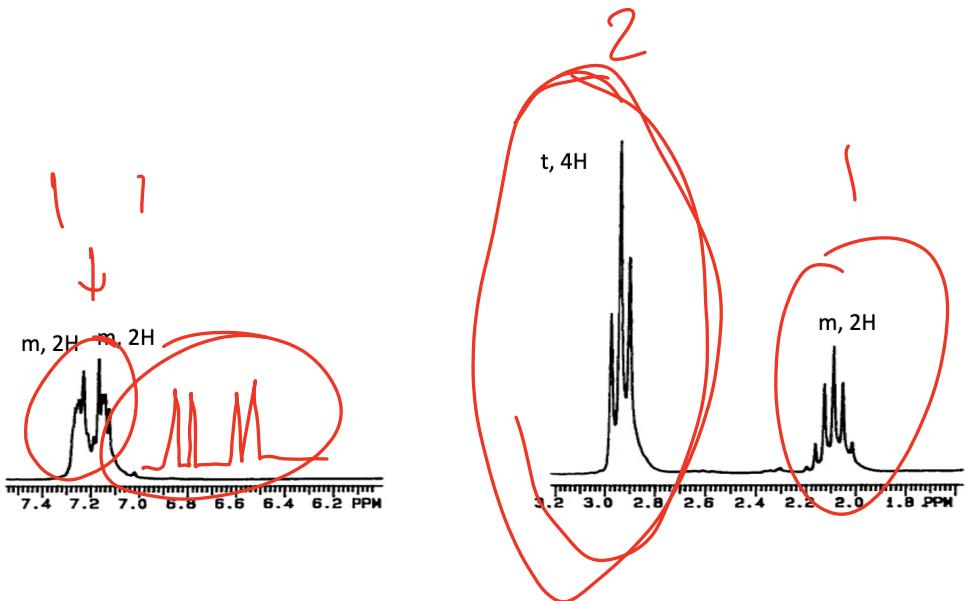
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# Structure Practice 1 Scratch Work

# Structure Practice 2

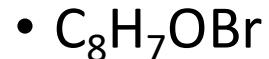
- $C_9H_{10}$

$$\frac{9 \times 2 + 2 - 10}{2} = 5$$



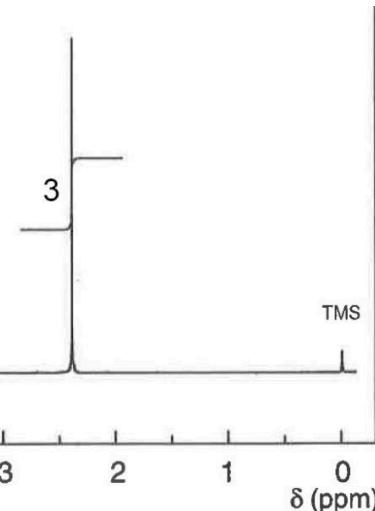
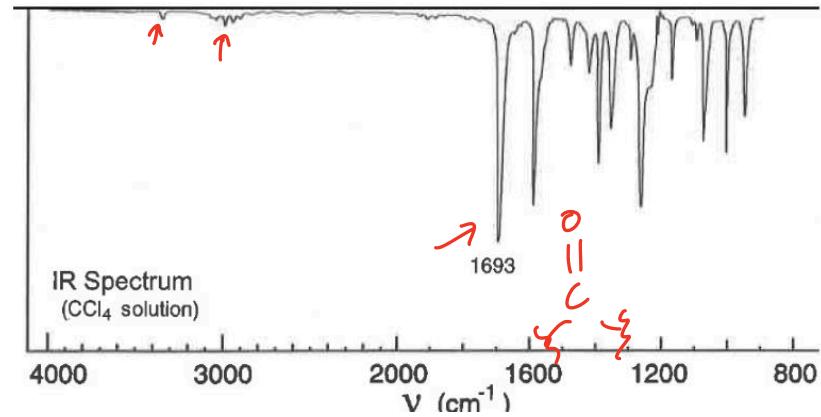
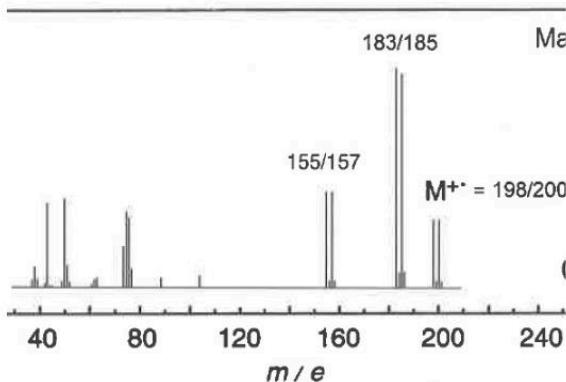
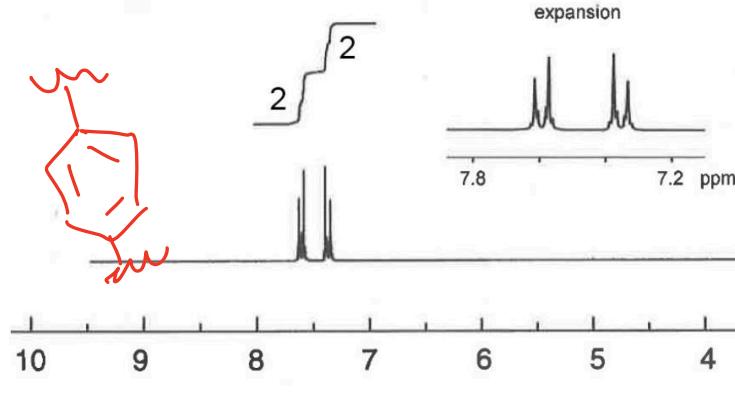
# Structure Practice 2 Scratch Work

# Structure Practice 3

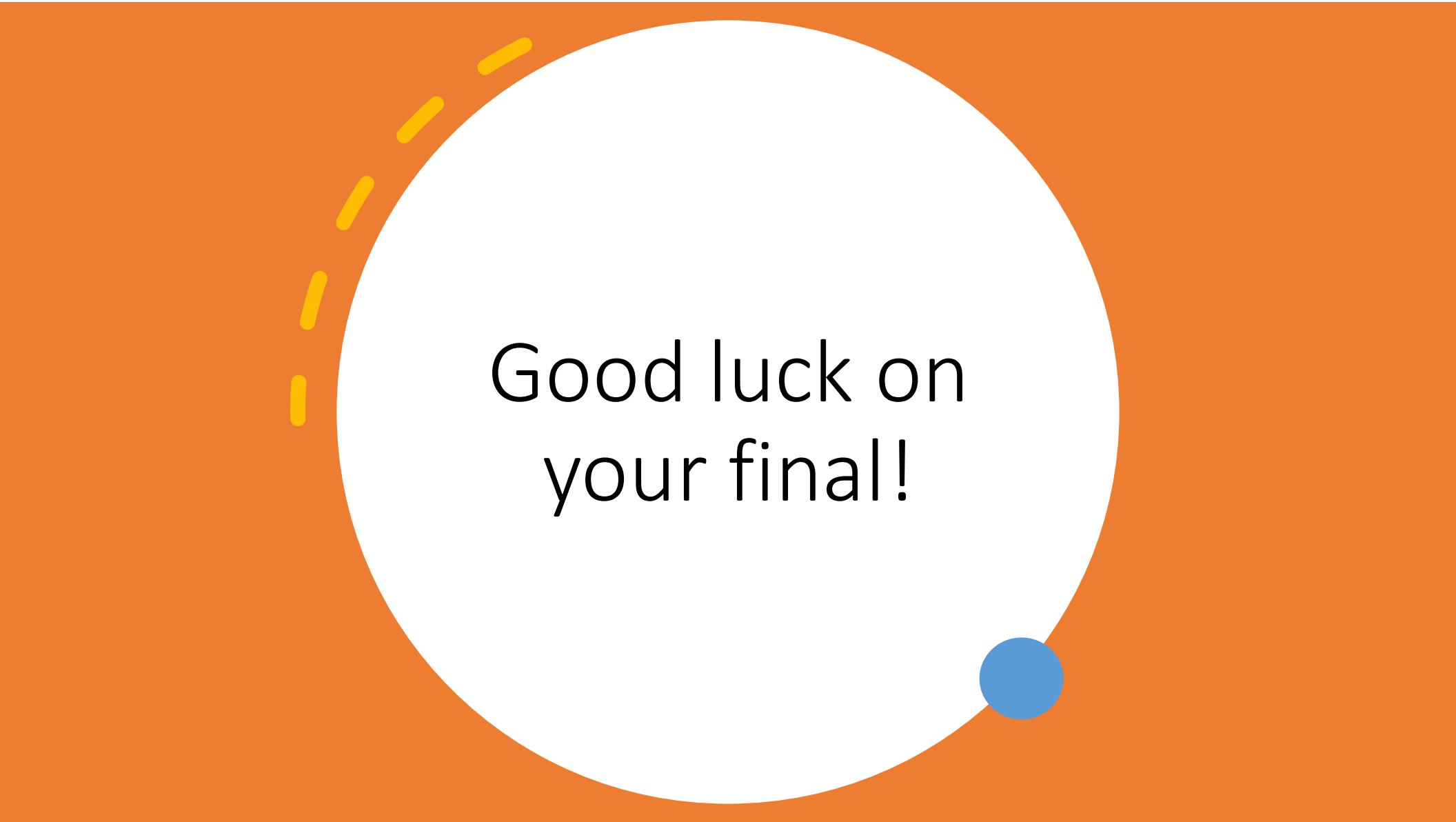


$$\frac{8 \cdot 2 + 2 - 7 - 1}{2} = 5$$

<sup>1</sup>H NMR Spectrum  
(200 MHz, CDCl<sub>3</sub> solution)



# Structure Practice 3 Scratch Work



Good luck on  
your final!