

Greenberg Final Pilot Review

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!

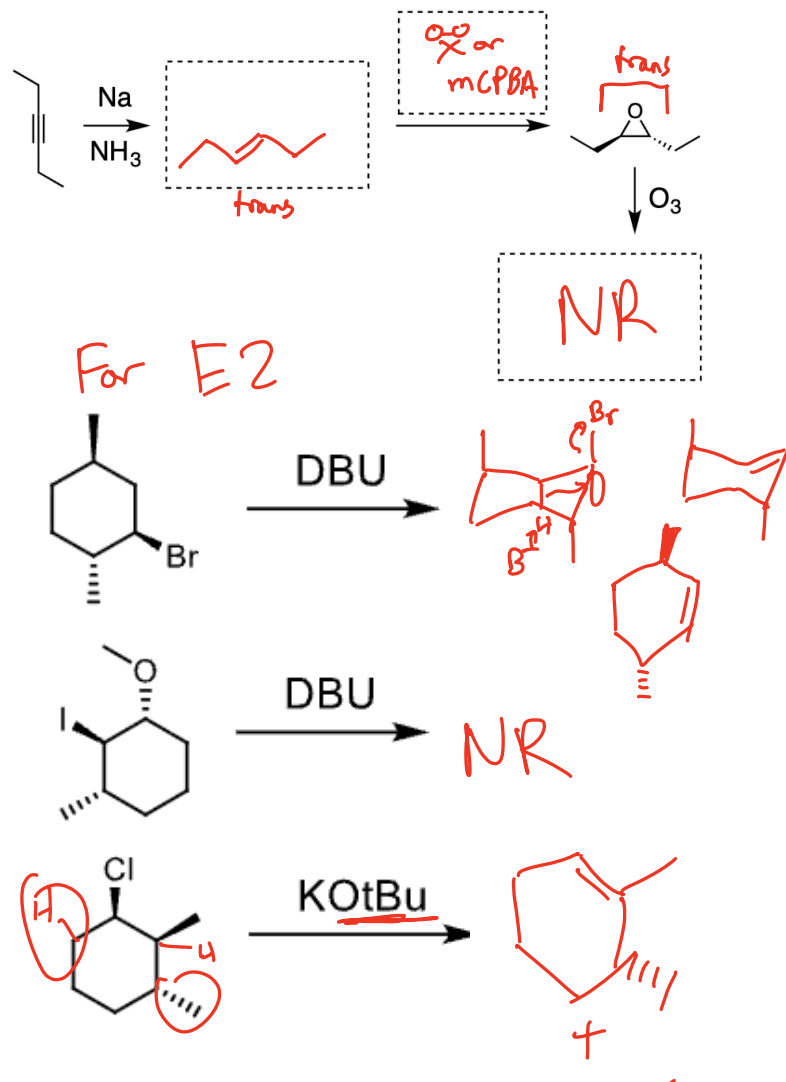
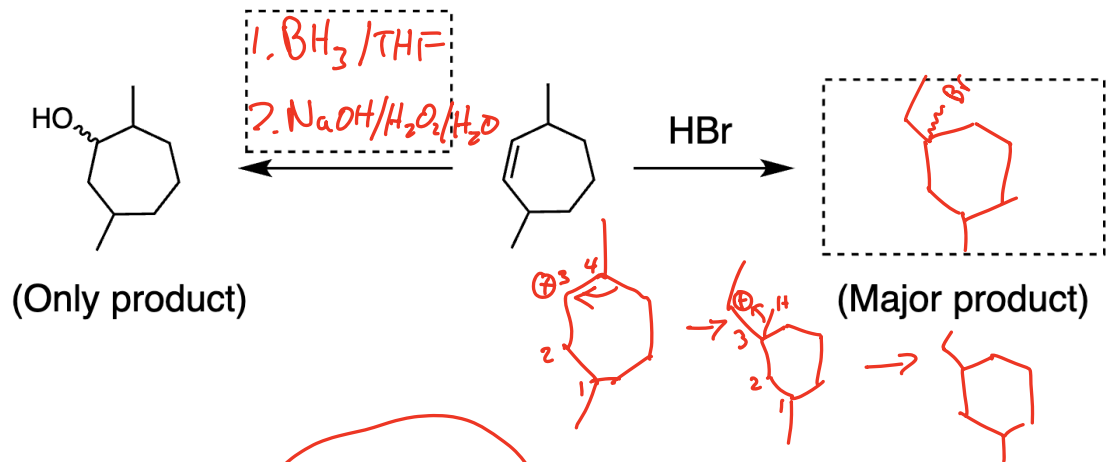
Almost all problems are pulled or adapted from Professor Tovar.

Tips for Reaction Questions

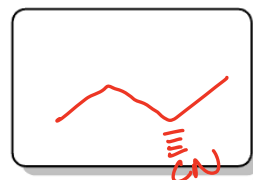
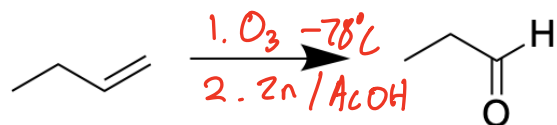
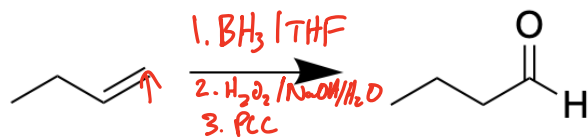
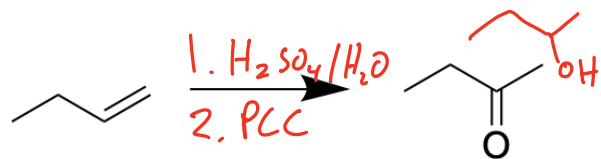
- For every reaction, you should know AT LEAST:
 - What is the product?
 - What are the intermediates?
 - What is the stereochemistry of the products?
 - What is the mechanism (not for all reactions but many)
 - What are the reagents?
 - Know conditions for each reaction (eg. SN1 vs SN2)
 - If I ask: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

Reaction Practice 1

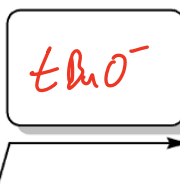
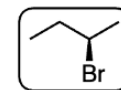
No reaction
is possible



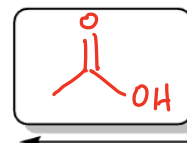
Reaction Practice 2



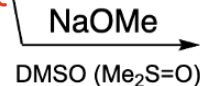
$\text{S}_{\text{N}}2$



$\text{E}2$

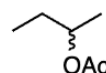
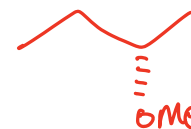
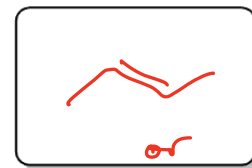


or HOAc

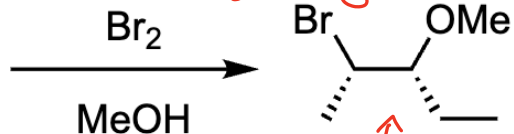
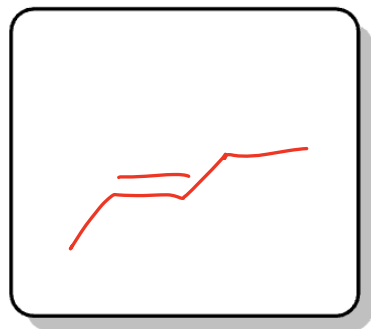


$\text{E}2$

$\text{S}_{\text{N}}2$

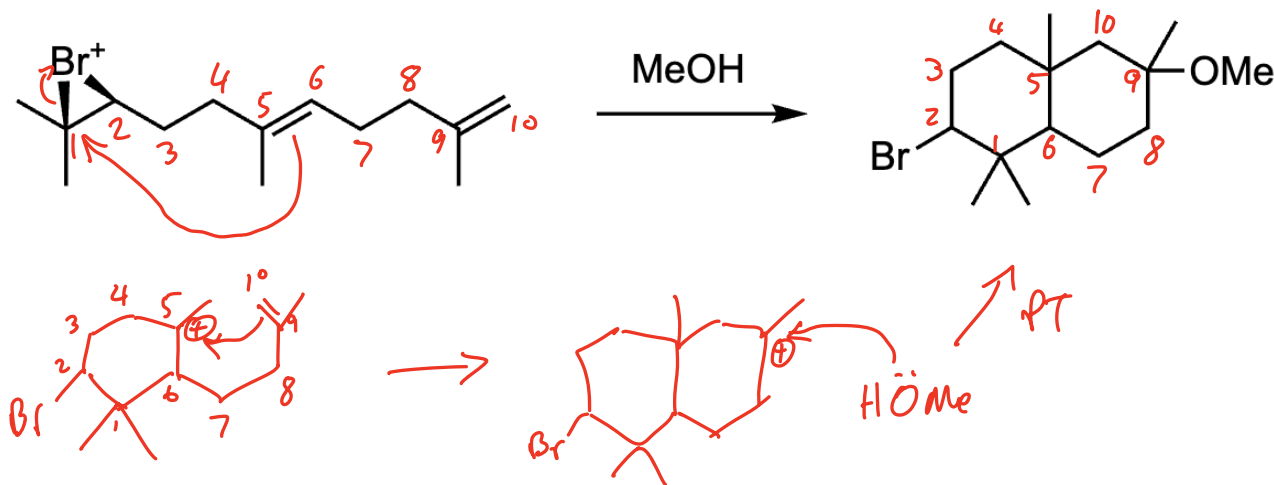


$\text{S}_{\text{N}}1$



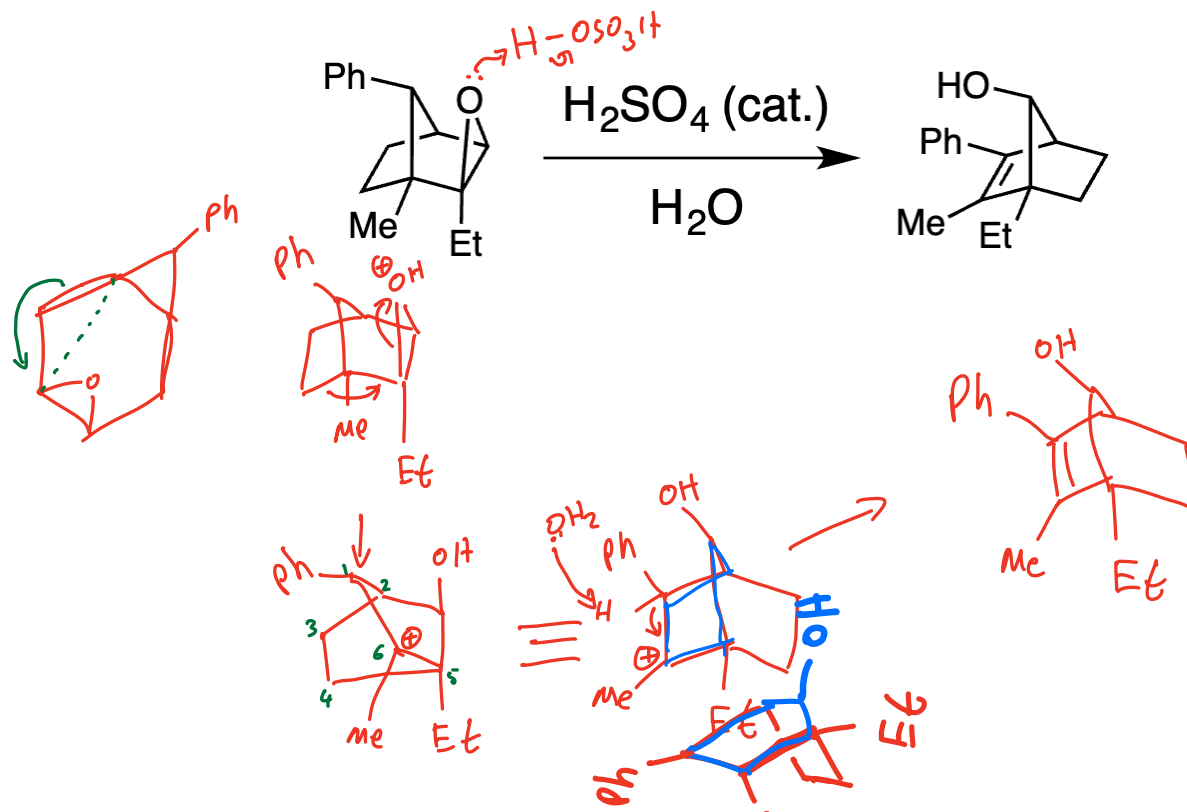
Reactions Practice 3

- Propose a mechanism for the following terpene rearrangement.



Reactions Practice 4

- Propose another mechanism.

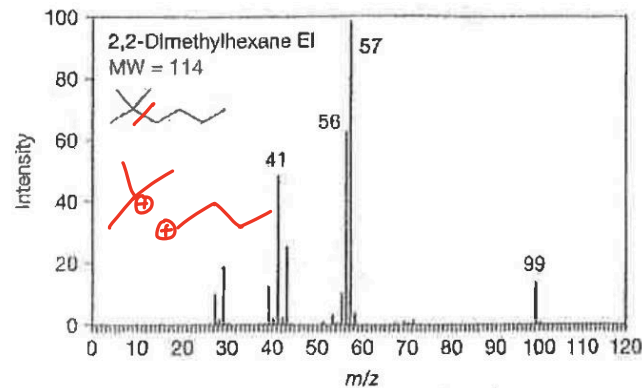
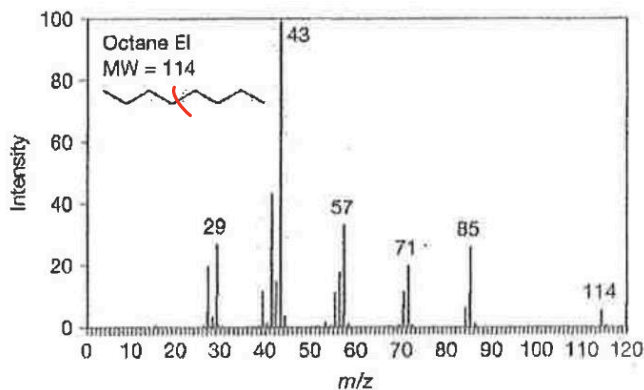


Tips for Structure Determination

- 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

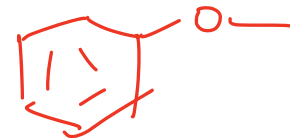
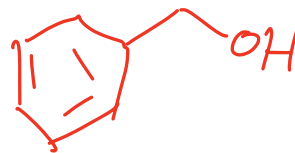
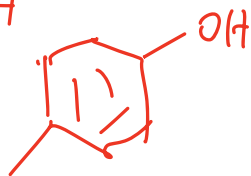
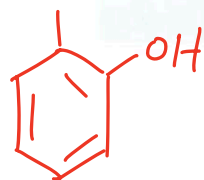
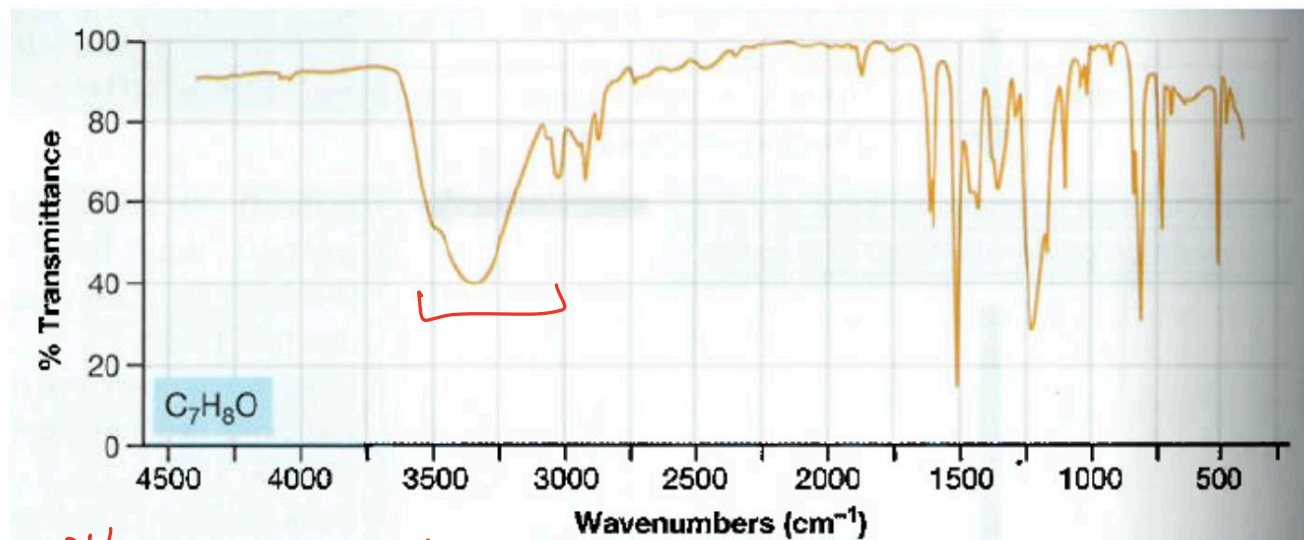
- Draw two possible fragments for the m/z 57 peak for 2,2-dimethylhexane. Then explain why the m/z 57 peak is smaller for octane.



IR Spectroscopy

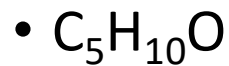
- Propose a structure for the following molecule.

$$\frac{7 \cdot 2 + 2 - 8}{2} = 4$$

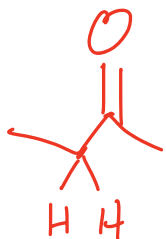


No OH
↓

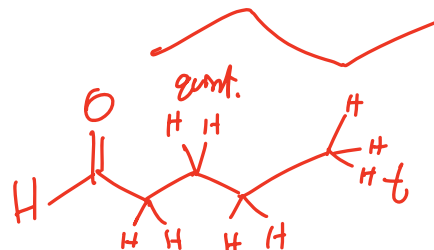
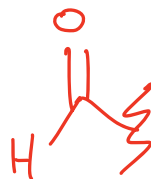
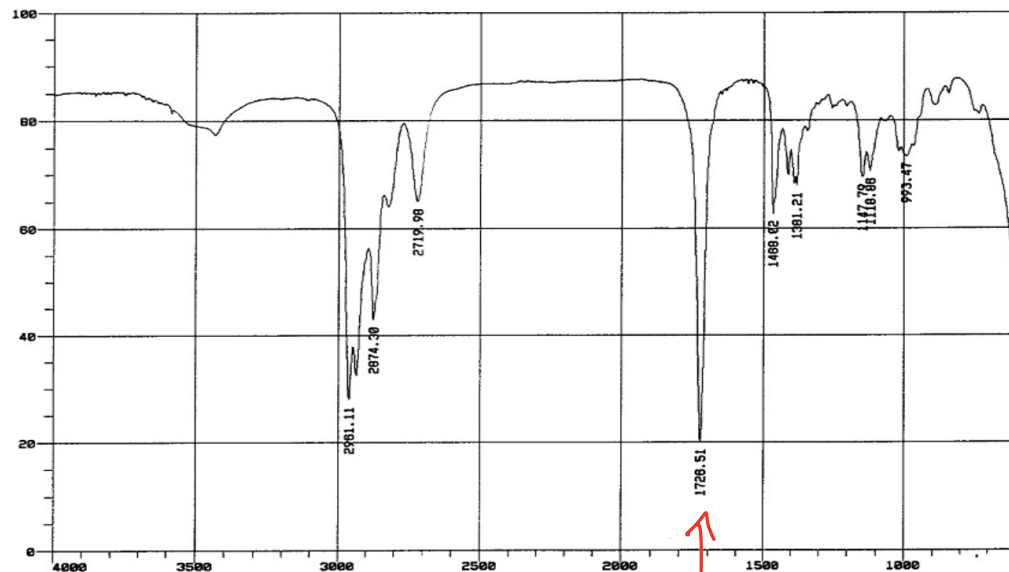
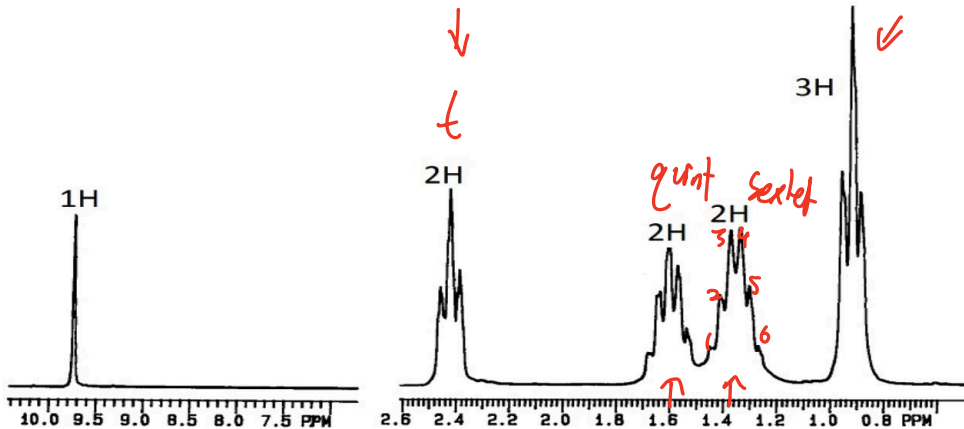
Structure Practice 1



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



trip

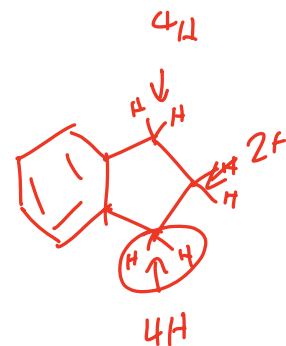
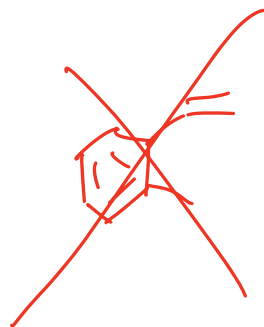
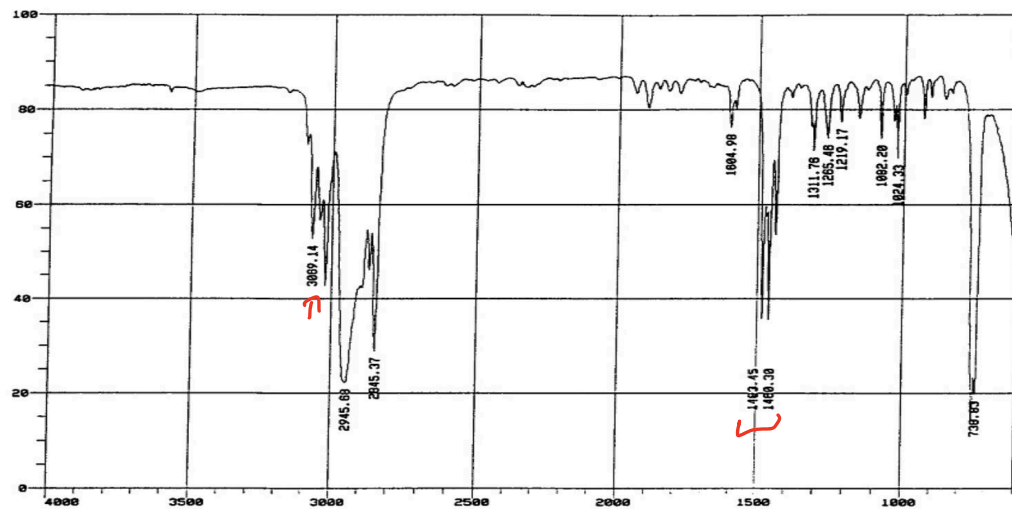
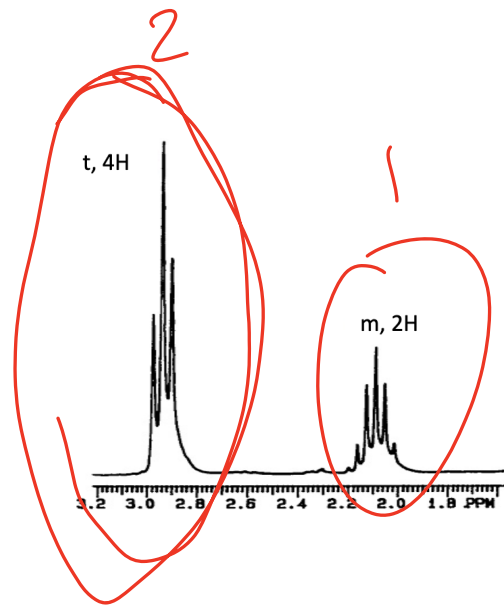
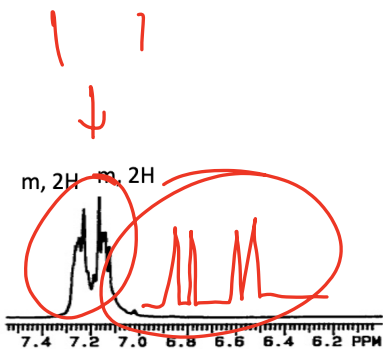


Structure Practice 1 Scratch Work

Structure Practice 2

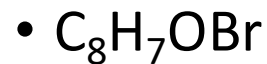
• C_9H_{10}

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

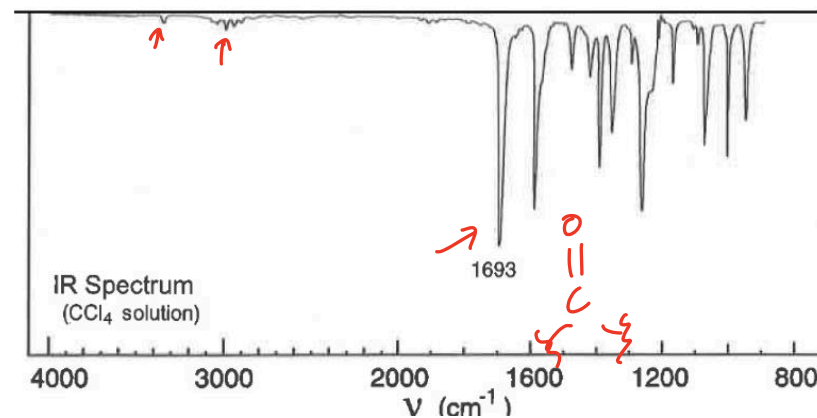
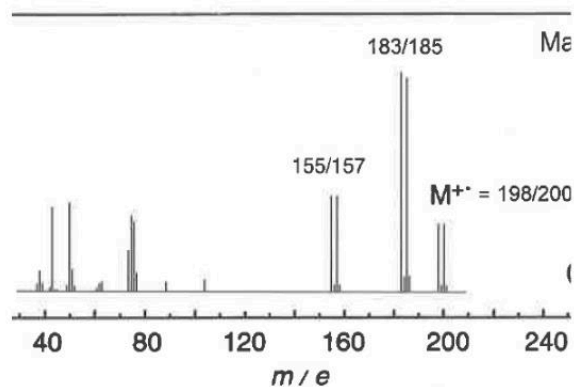


Structure Practice 2 Scratch Work

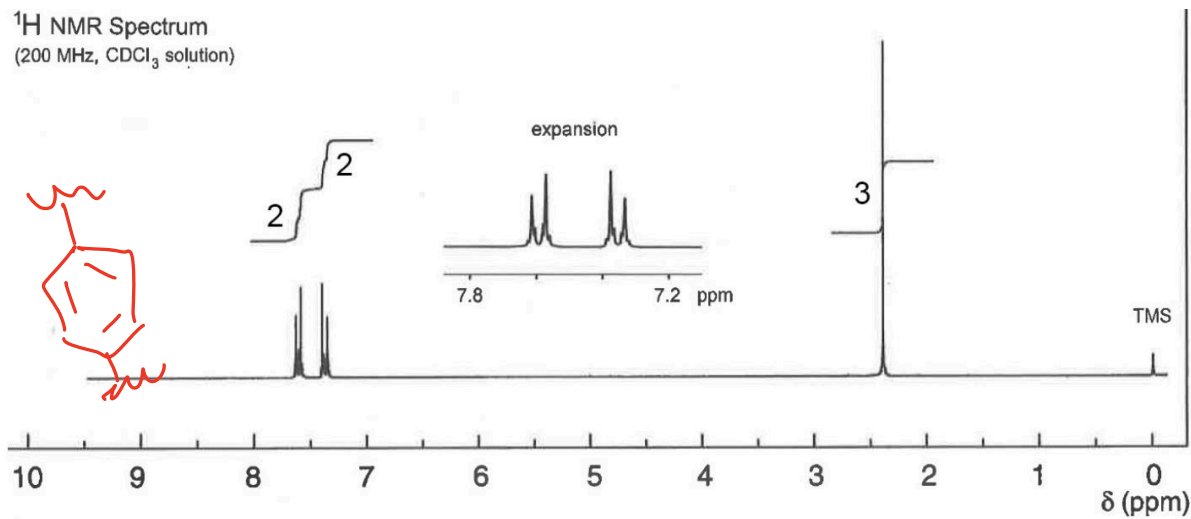
Structure Practice 3



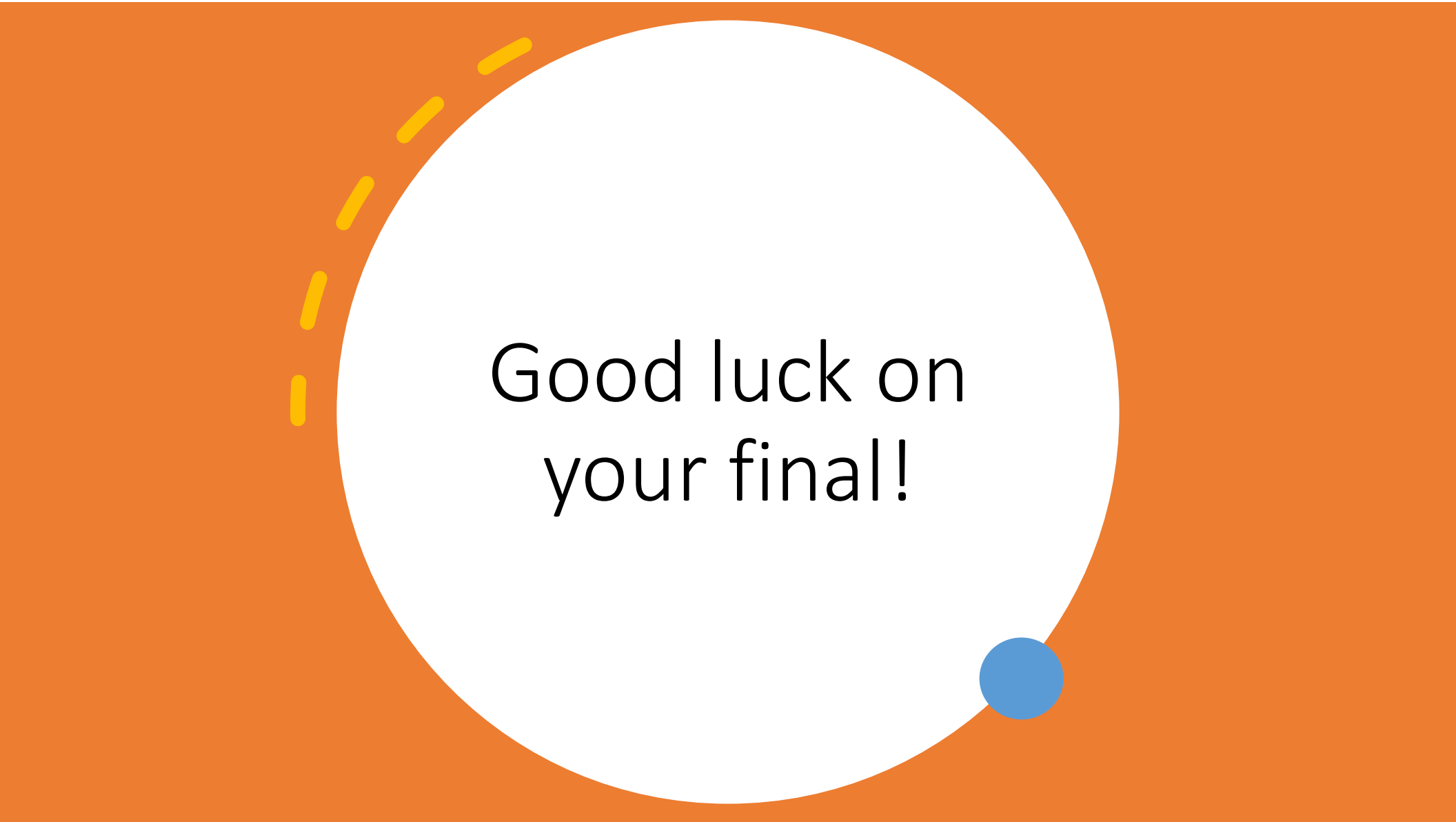
$$\frac{8.2 + 2 - 7 - 1}{2} = 5$$



1H NMR Spectrum
(200 MHz, $CDCl_3$ solution)



Structure Practice 3 Scratch Work



Good luck on
your final!