2019 ORG MECH: Electrophiles and Acids FINAL 100 points

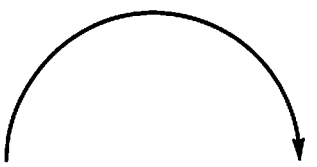
NAME:_____

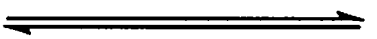
1) (4+2+2+3=11pts)
a) List the **4** things that can happen to a carbocation.

b) What is *Occam's Razor*?

c) Can you prove a mechanism is correct?

d) What are the precise scientific meanings of these three different arrows?





2) (6x2=12pts) Define the following terms:

Electrophile

Protic Acid

Mechanism

Isomer

Rearrangement

Ring strain

3) (2pts) Name two of the things you should check when critically evaluating the curly arrows you have drawn to represent a mechanism.

THE NEXT SECTION
HAS 4
MECHANISM PROBLEMS

W, X, Y and Z

EACH IS WORTH 25 PTS

<u>ATTEMPT ALL OF THEM</u>

<u>I WILL PICK YOUR HIGHEST SCORING THREE</u>

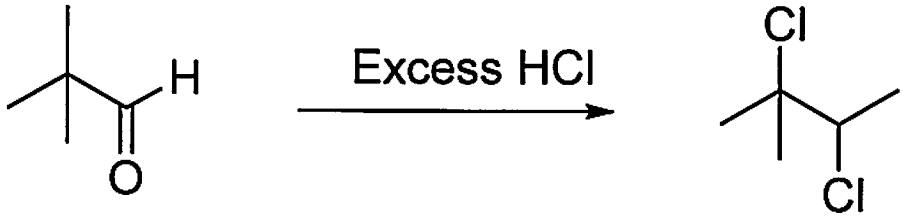
(For 3x25 = 75 pts)

Partial credit will be awarded for:

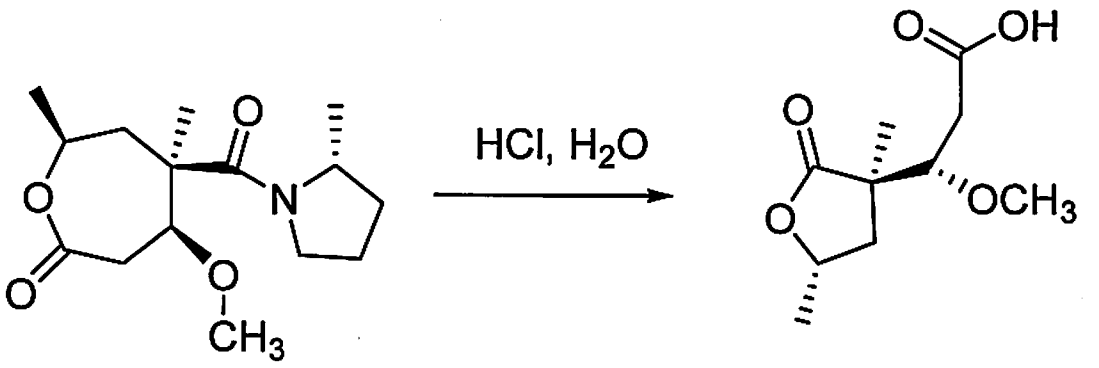
i) Correct atom labelling between SM and Products
ii) "Correct" Organic Chemistry
iii) Resonance structures and "justifications"

(I will award up to 5/5 bonus points for the 4th answer).

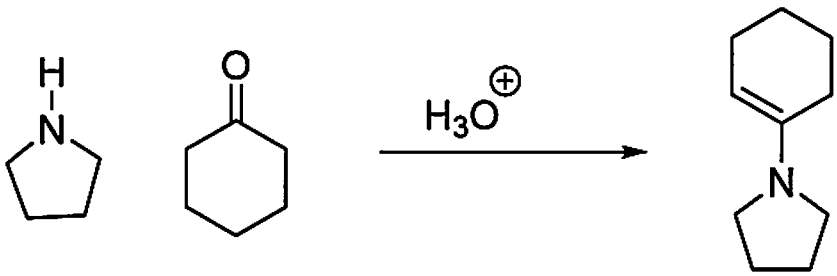
W) Draw the mechanism (*i.e. curly arrows*) for this reaction.



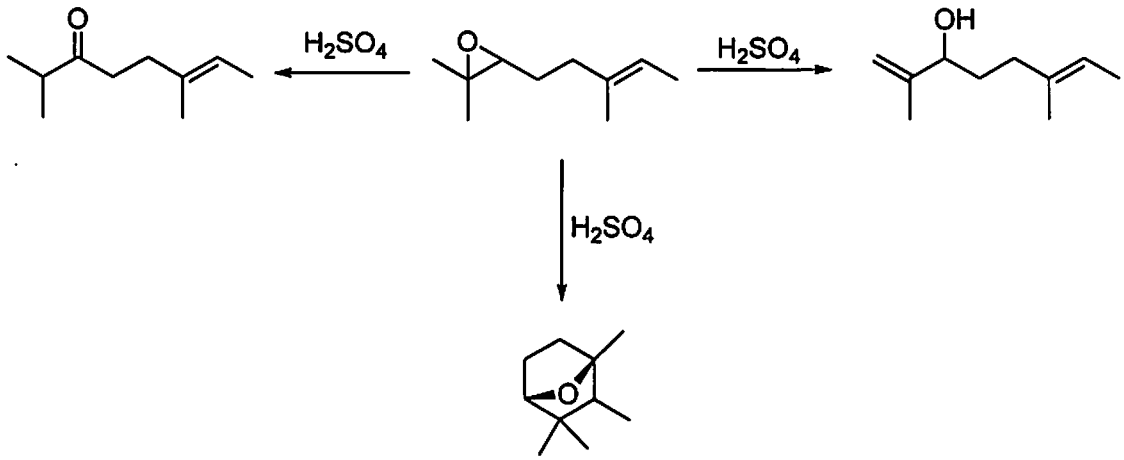
X) Draw the mechanism (*i.e. curly arrows*) for this reaction.



Y) Draw the mechanism (*i.e. curly arrows*) for this reaction.



Z) Draw the mechanism (*i.e. curly arrows*) for this reaction which produces three different products (*all coming from the same carbocation intermediate*).



2019 ORG MECH: Electrophiles and Acids FINAL 100 points

NAME: Perfect Answers

1) (4+2+2+3=11pts)

a) List the **4** things that can happen to a carbocation.

① React with the leaving Group (→ starting material)

② React with a Nucleophile (→ SN1 Product)

③ React with a base & deprotonate (→ E1 Product)

④ Rearrange to a cation of similar or improved stability.

b) What is *Occam's Razor*?

(With everything else being equal) the simplest solution is usually the best solution.

c) Can you prove a mechanism is correct?

No. You can only disprove incorrect mechanisms.

d) What are the precise scientific meanings of these three different arrows?

The movement of 2 electrons.

This arrow relates species that are "in equilibrium" with one another.

The "resonance" arrow relates species that only differ in their location of electron density.

2) (6x2=12pts) Define the following terms:

Electrophile

A species that receives 2 electrons from a Nucleophile.

Protic Acid

A species that can act as a $H^{\oplus}$ donor.

Mechanism

The step by step movement of electrons that describes a chemical reaction.

Isomer

Species with the same molecular formula, but are 'different'.

Rearrangement

A reaction where the main skeleton (or sequence of atoms) is re-organised (usually with 'migrations' or 'shifts').

Ring strain

The extra energy cost of having a cyclic system (made up of angle strain and torsional strain).

3) (2pts) Name two of the things you should check when critically evaluating the curly arrows you have drawn to represent a mechanism.

- Arrows should start at the $2e^-$ that are moving.
- Arrows should show exactly where the $2e^-$ are going to.
- The direction of the arrow should make 'scientific' sense.

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HAS 4
MECHANISM PROBLEMS

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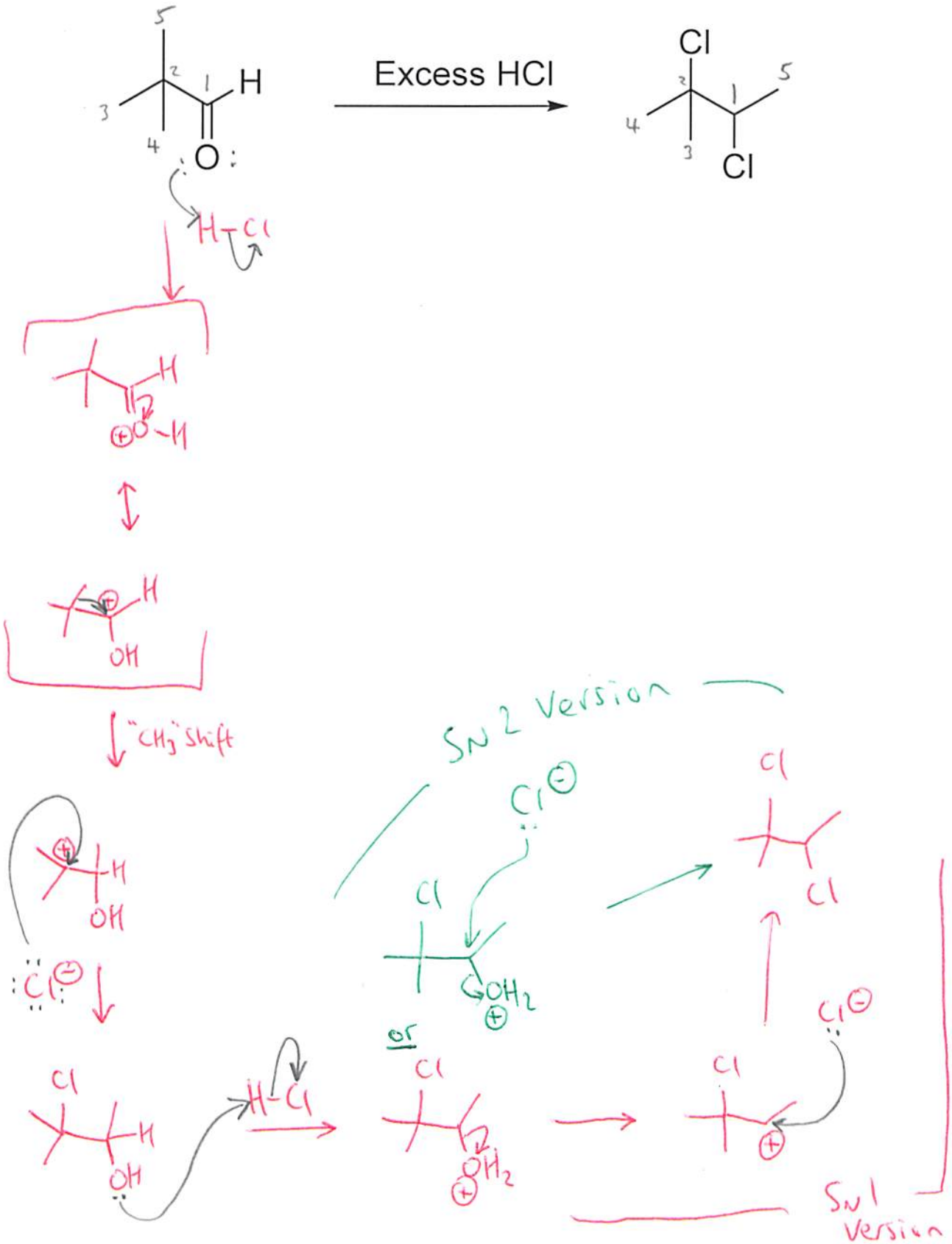

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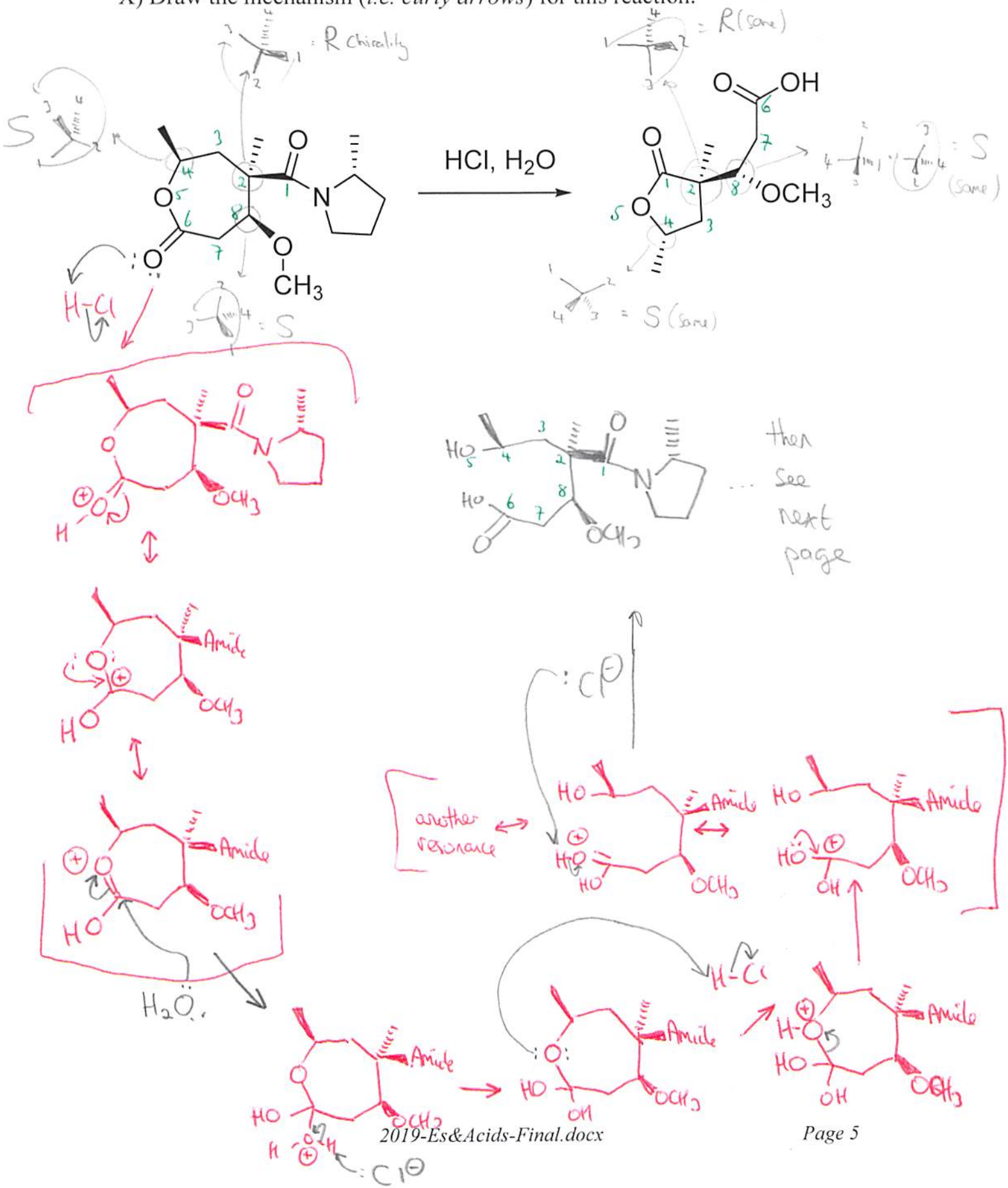
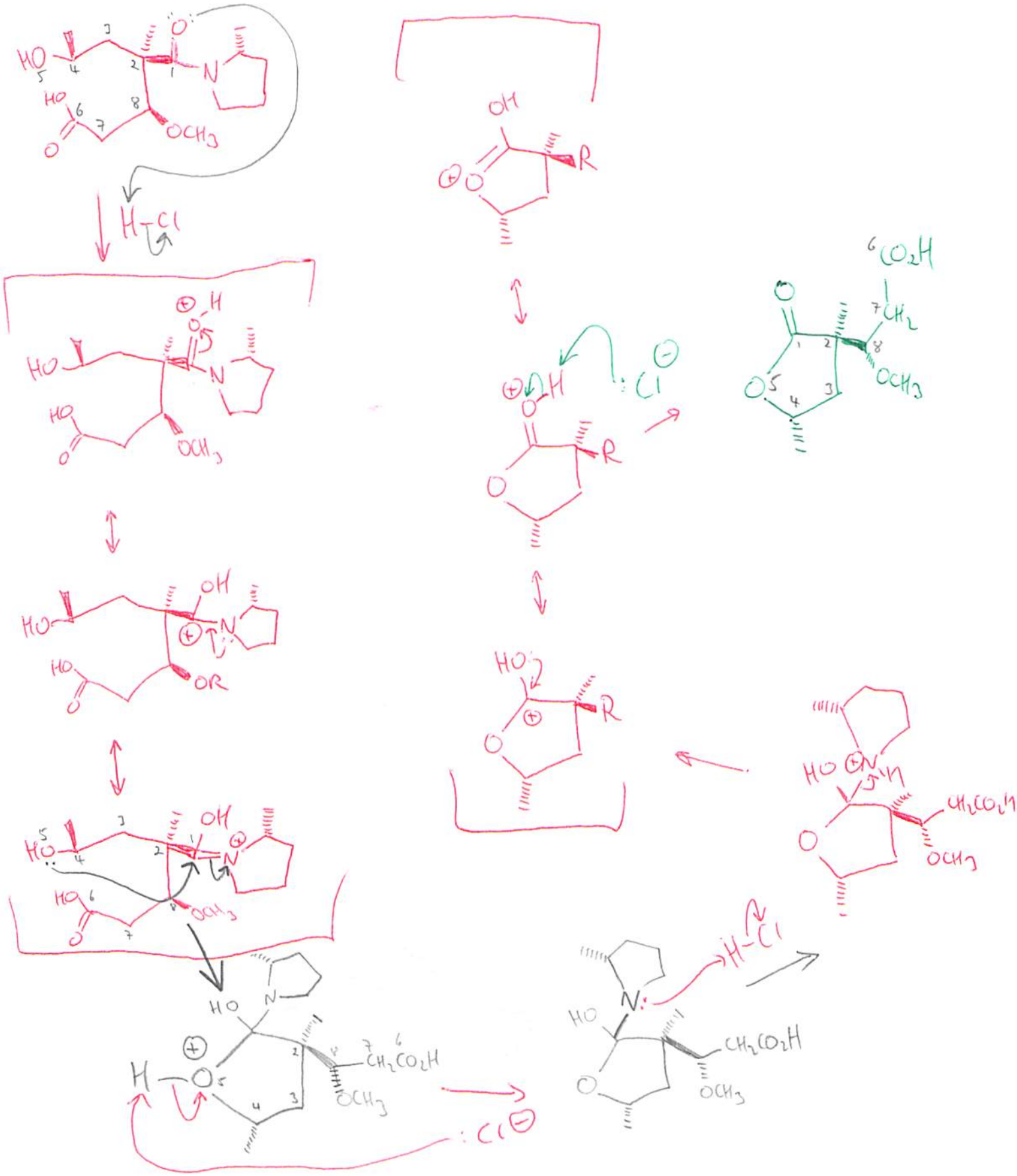


mechanism for X) continued



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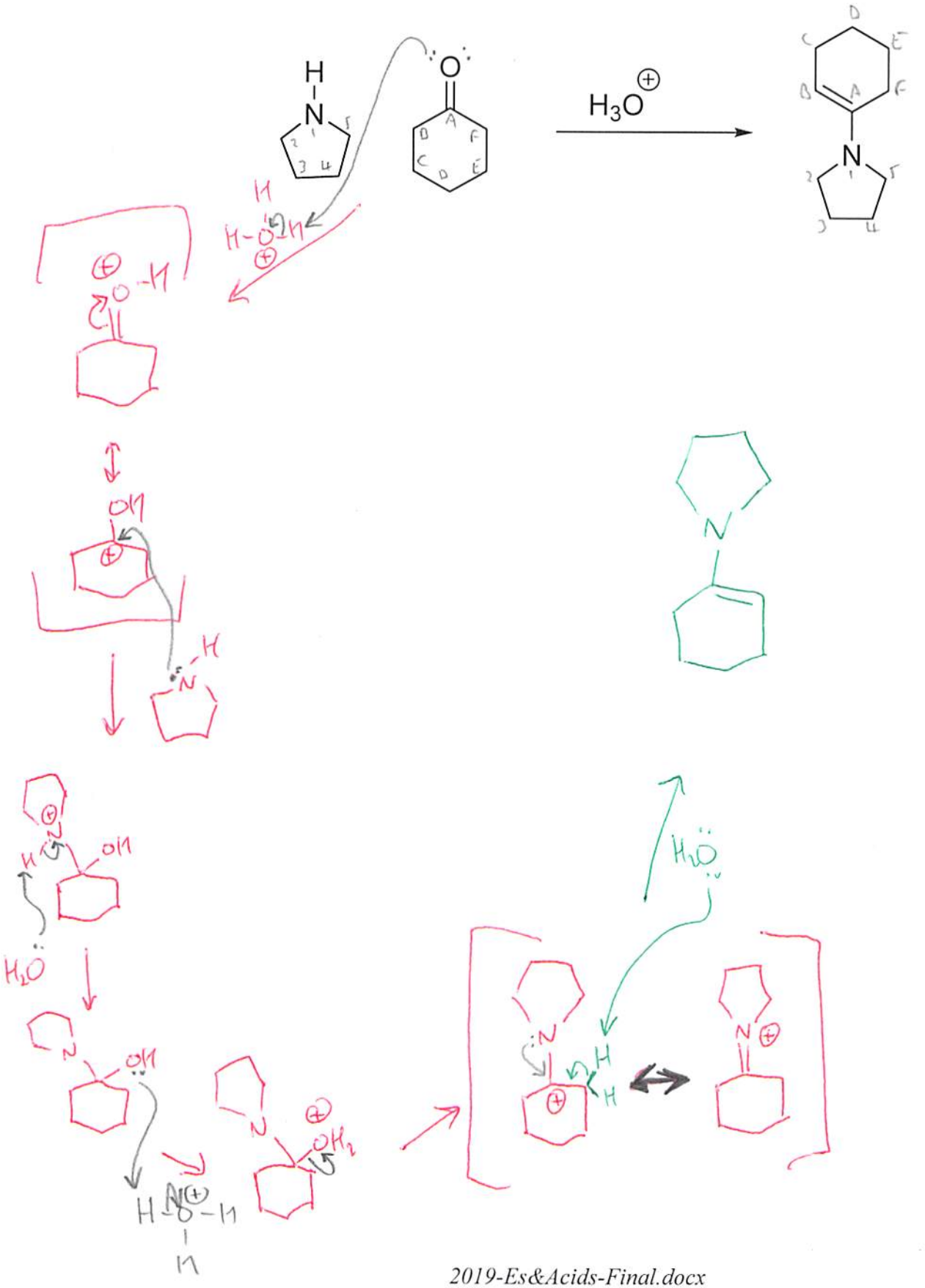
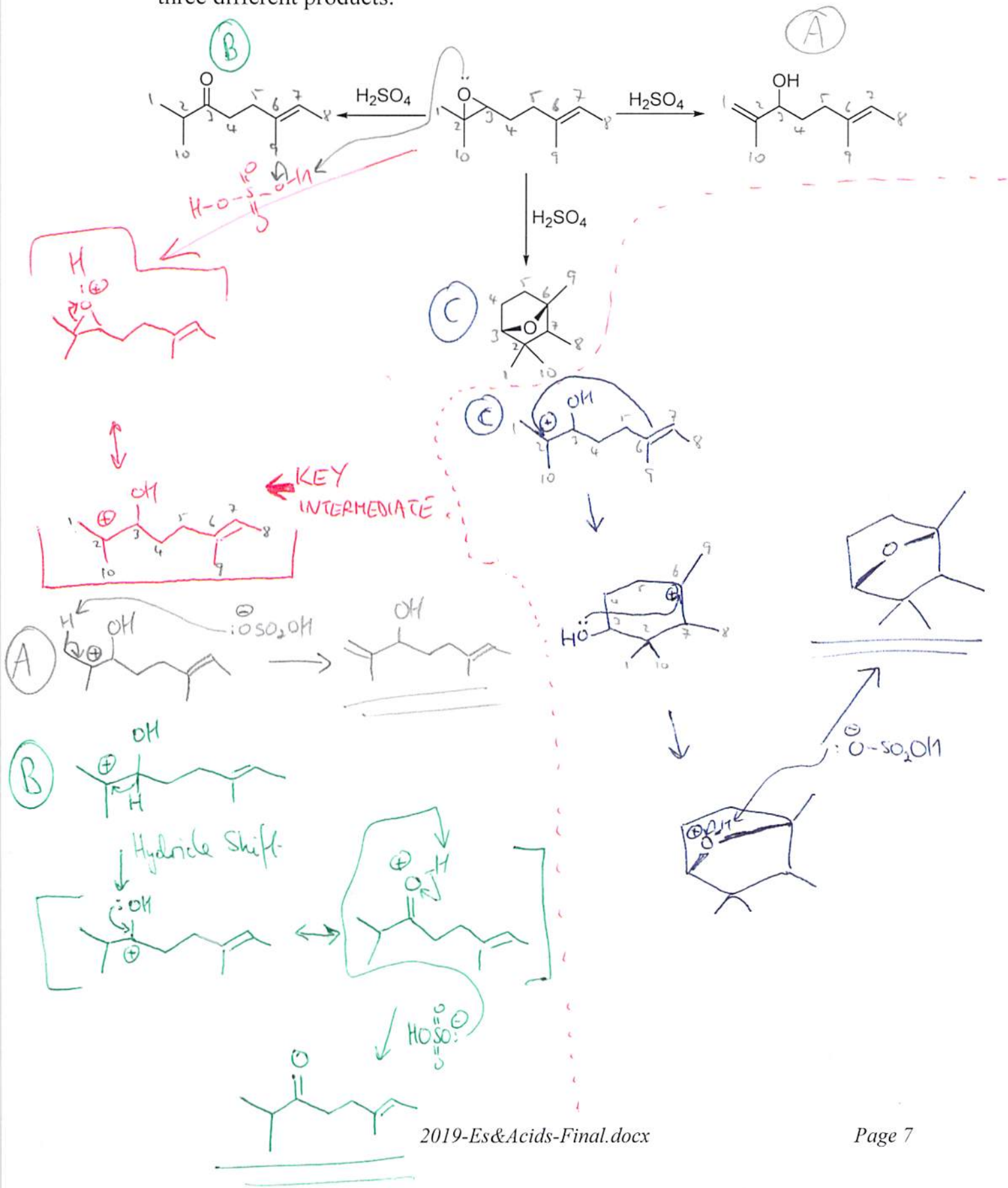
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