

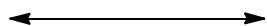
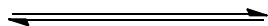
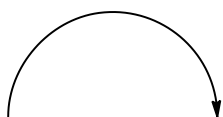
1) (4+1+2+3=10pts)

a) List the 4 things that can happen to a cation.

b) What is *Occam's Razor* ?

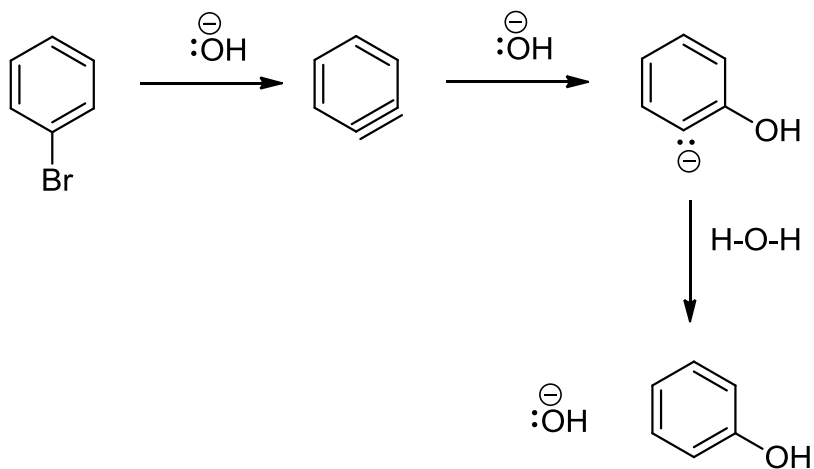
c) Can you prove a mechanism is correct ?

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

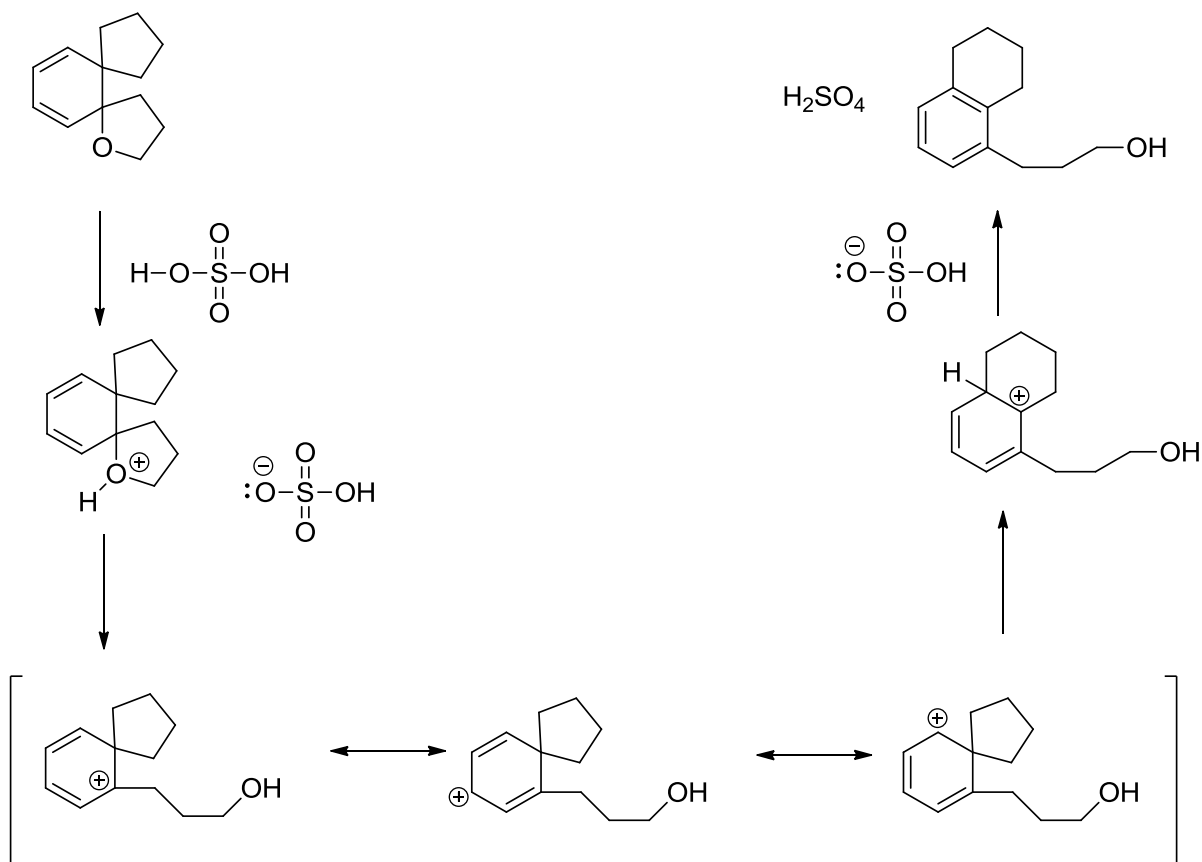




3) (5pts) Draw in the curly arrows for this reaction.



4) (10pts) Draw the arrows for this reaction.



5) (10pts)

a) List two features of an  $S_N2$  reaction.

b) List three things you should check before you submit your completed exam.

c) What characteristic must a *protic* solvent have ?

d) List two features of a carbocation rearrangement.

e) What is *Anchimeric Assistance* ?

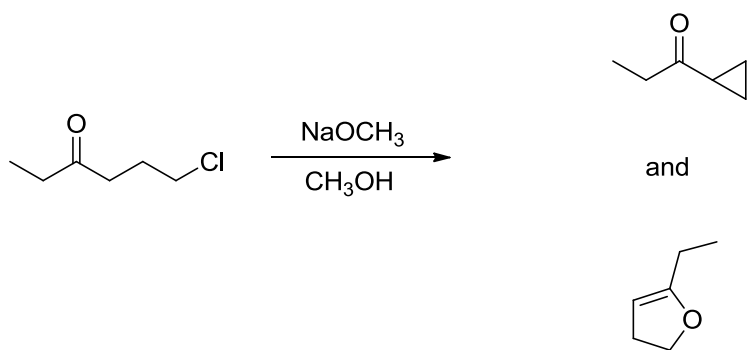
**THE NEXT SECTION HAS 4  
BASE / ANION PROBLEMS**

**(A) – (D)**

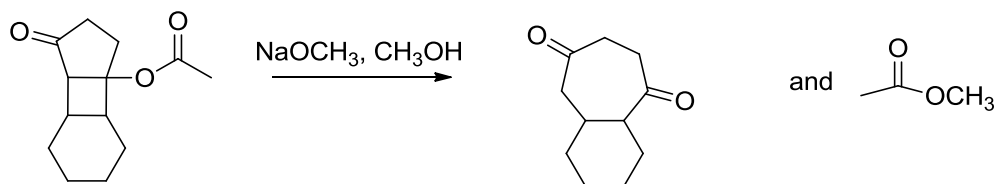
**EACH WORTH 25 PTS**

**ANSWER ANY 3  
(For 75 pts)**

A) (25pts) Draw the mechanism for the following transformation.

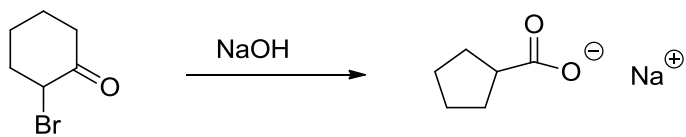


B) (25pts) Draw the mechanism for the following transformation.

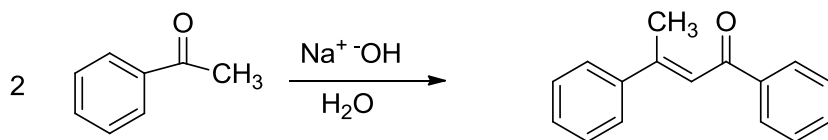




C) (25pts) Draw the mechanism for the following transformation.



D) (25pts) Draw the mechanism for the following transformation.



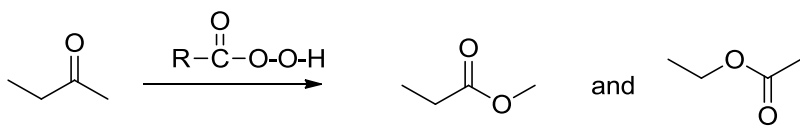
**THE NEXT SECTION HAS 4  
ACID / CATION PROBLEMS**

**(E) – (H)**

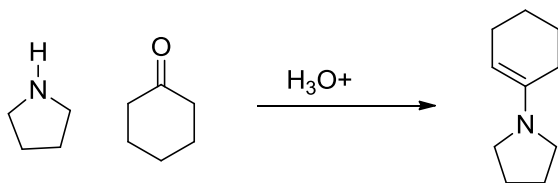
**EACH WORTH 25 PTS**

**ANSWER ANY 3  
(For 75 pts)**

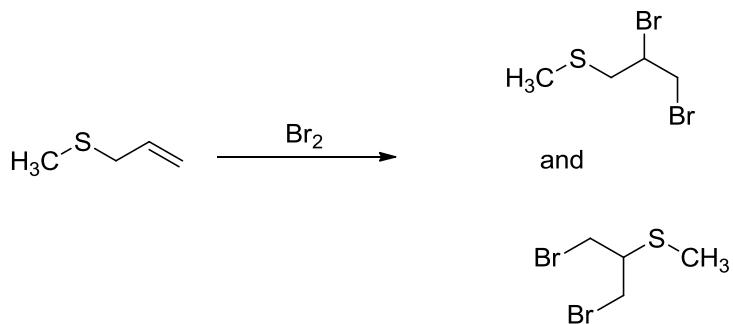
E) (25pts) Draw the mechanism for the following transformation.



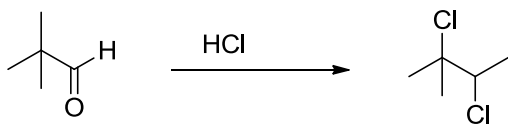
F) (25pts) Draw the mechanism for the following transformation.



G) (25pts) Draw the mechanism for the following transformation.



H) (25pts) Draw the mechanism for the following transformation.



1) (4+1+2+3=10pts)

a) List the 4 things that can happen to a cation.

- 1) React with original leaving group to regenerate S<sub>N</sub>.
- 2) React with a nucleophile (→ S<sub>N</sub>1 product)
- 3) Lose a proton to give an E1 product.
- 4) Rearrange

b) What is Occam's Razor?

If all other things equal, the simpler solution is usually the better solution.

c) Can you prove a mechanism is correct?

No, you can only disprove an incorrect mechanism.

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



• "movement of 2 electrons."



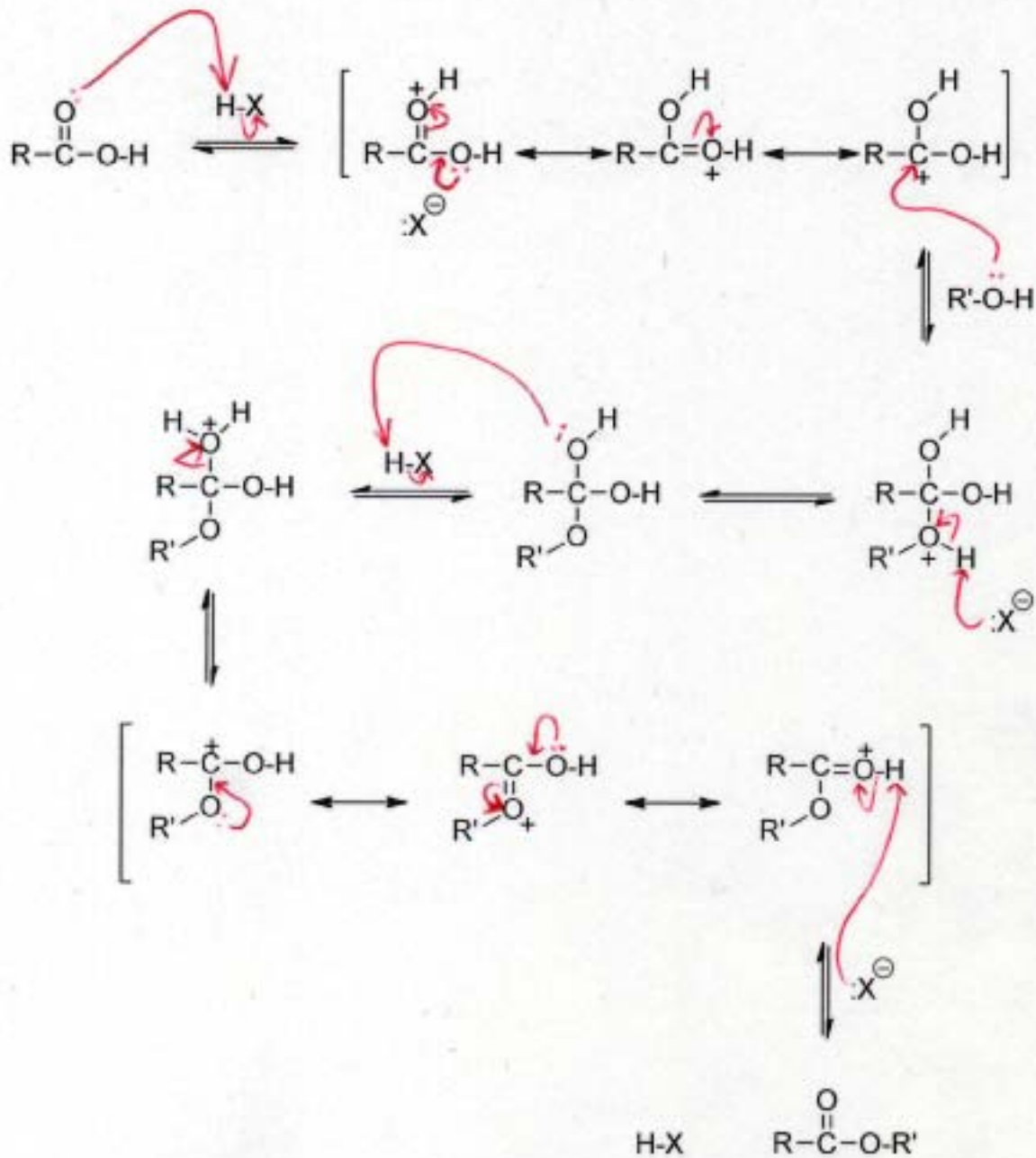
• "is in equilibrium with"



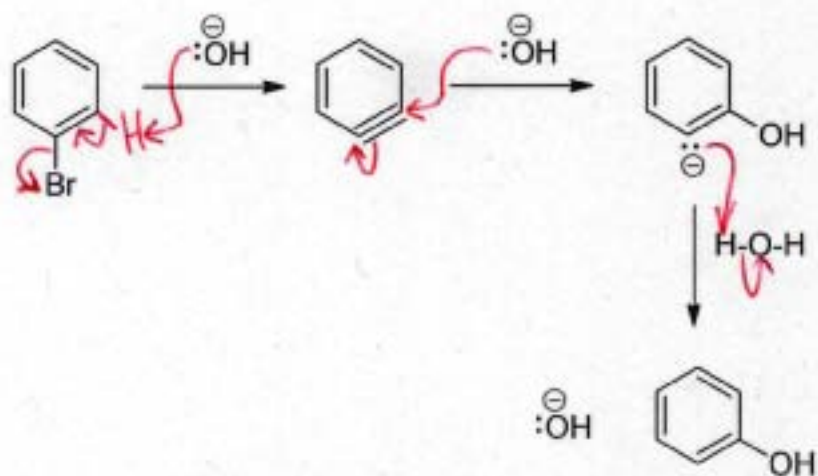
• "is a resonance structure of"



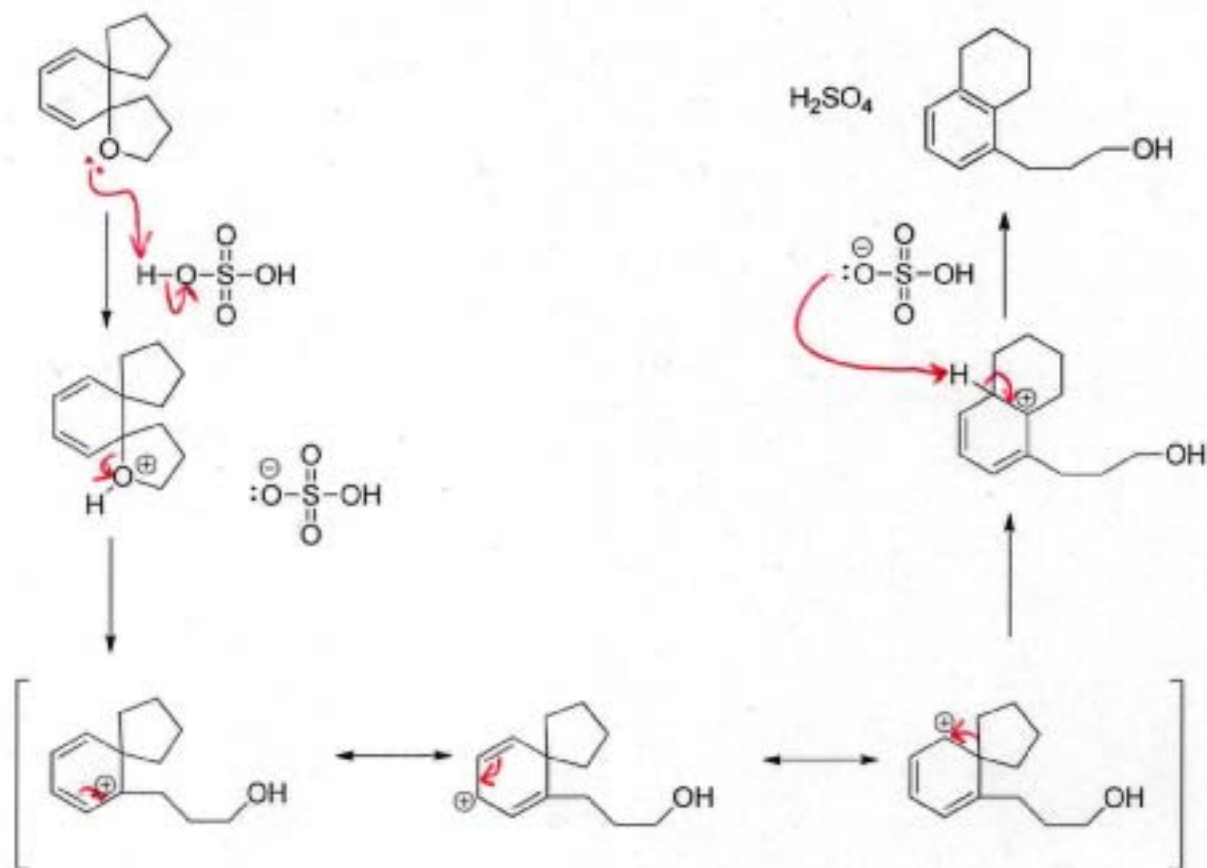
2) (15pts) Draw in all the curly arrows for the following mechanism of an acid catalyzed esterification. (10pts)



3) (5pts) Draw in the curly arrows for this reaction.



4) (10pts) Draw the arrows for this reaction.



5) (10pts)

a) List two features of an  $S_N2$  reaction.

- Back side attack
- 100% inversion
- Bimolecular kinetics
- substitution
- needs a L.G.
- concerted
- etc

b) List three things you should check before you submit your completed exam.

- Charges
- arrows
- numbering schemes
- obeying organic chemistry rules
- answered sufficient questions
- etc

c) What characteristic must a *protic* solvent have?

One or more acidic hydrogens.

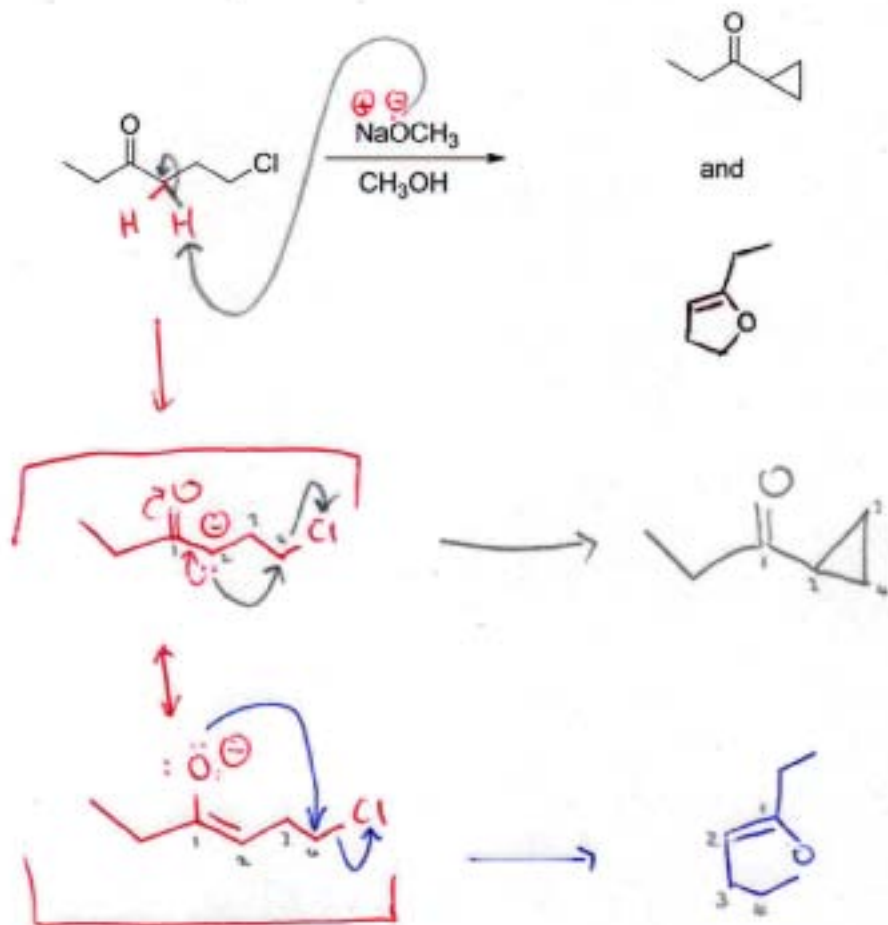
d) List two features of a carbocation rearrangement.

- A 1,2 shift
- Give cations of equal or improved stability

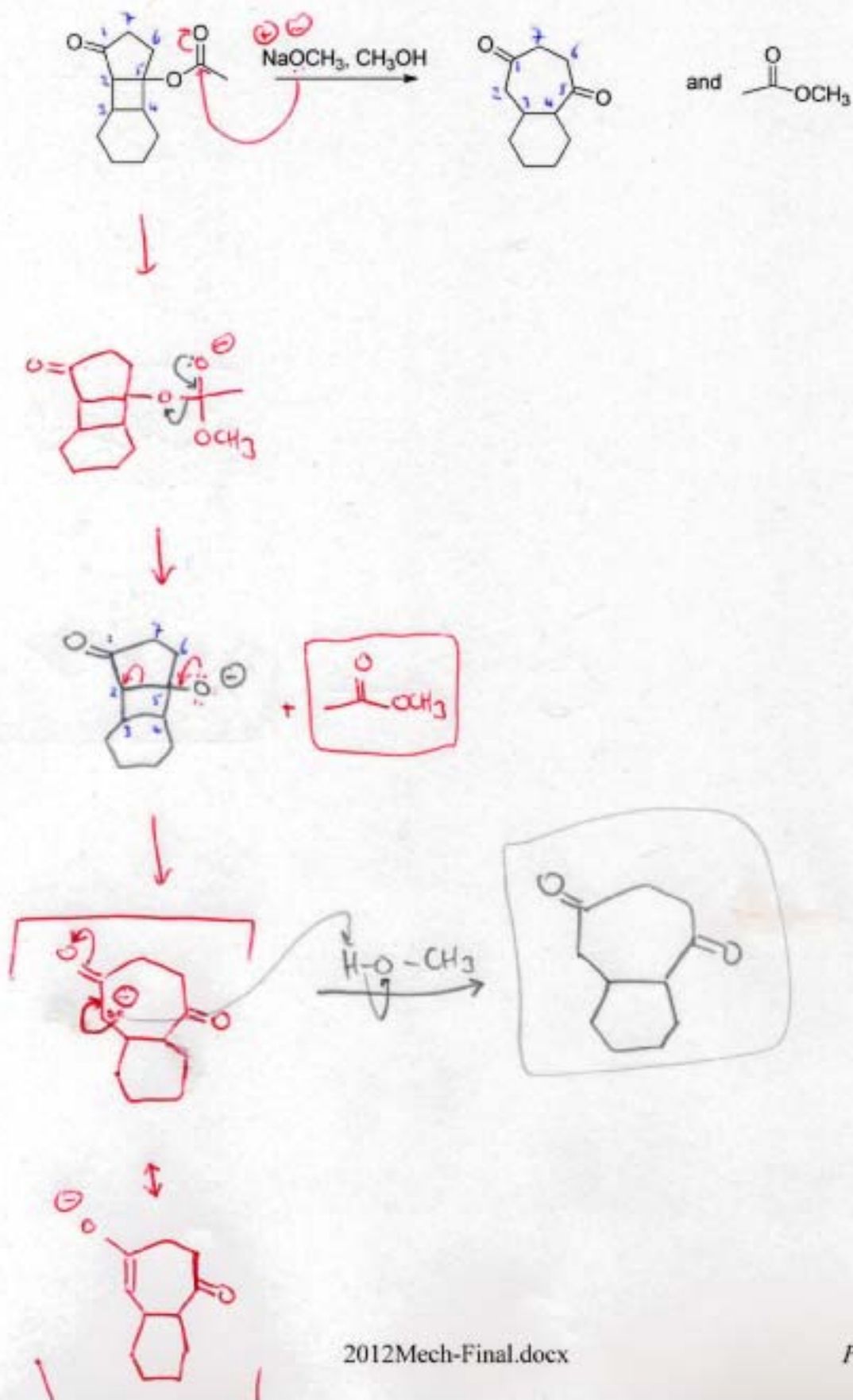
e) What is *Anchimeric Assistance*?

Neighbouring Group Participation where an intramolecular reaction occurs altering the reaction in some way.

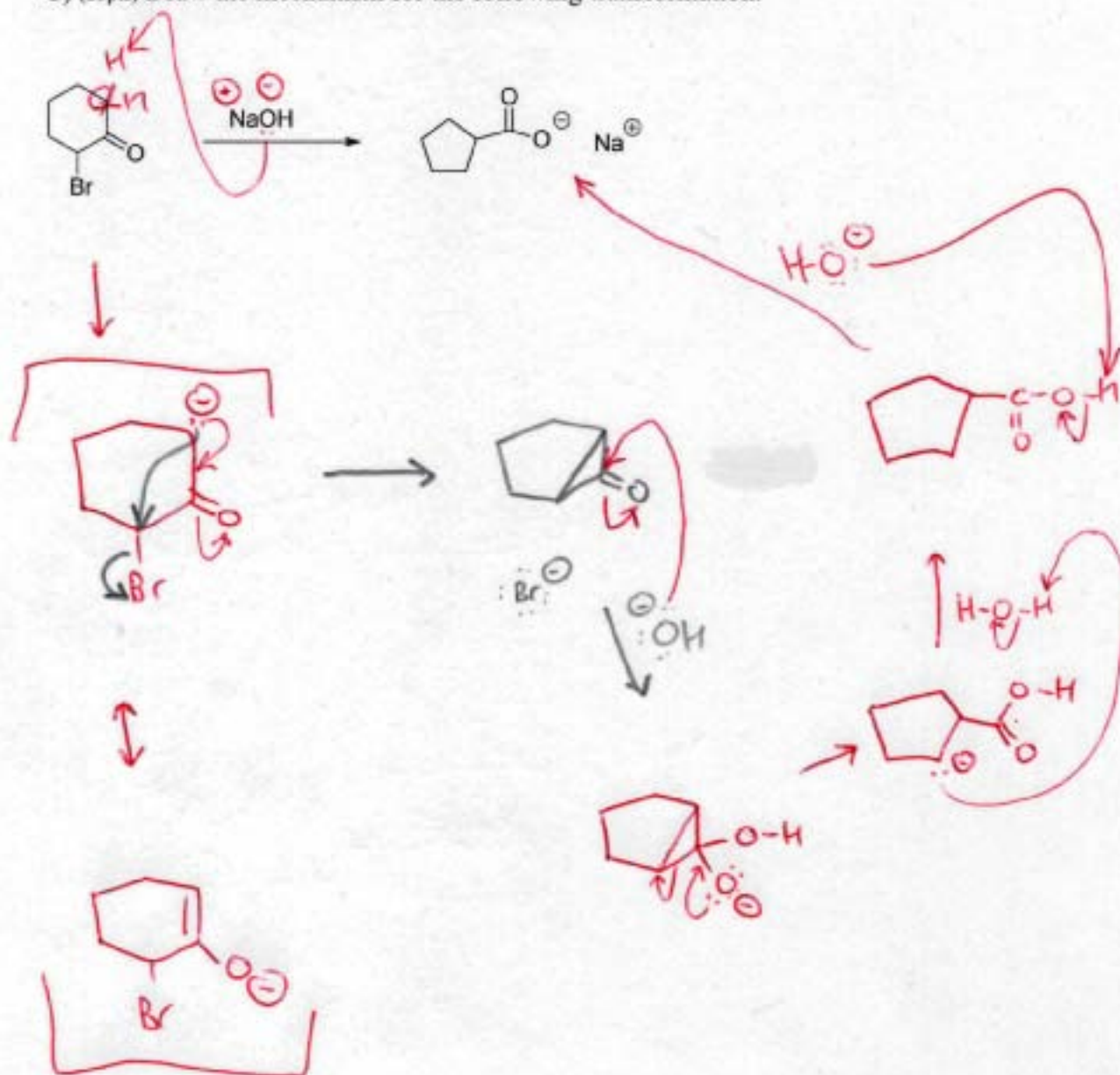
A) (25pts) Draw the mechanism for the following transformation.



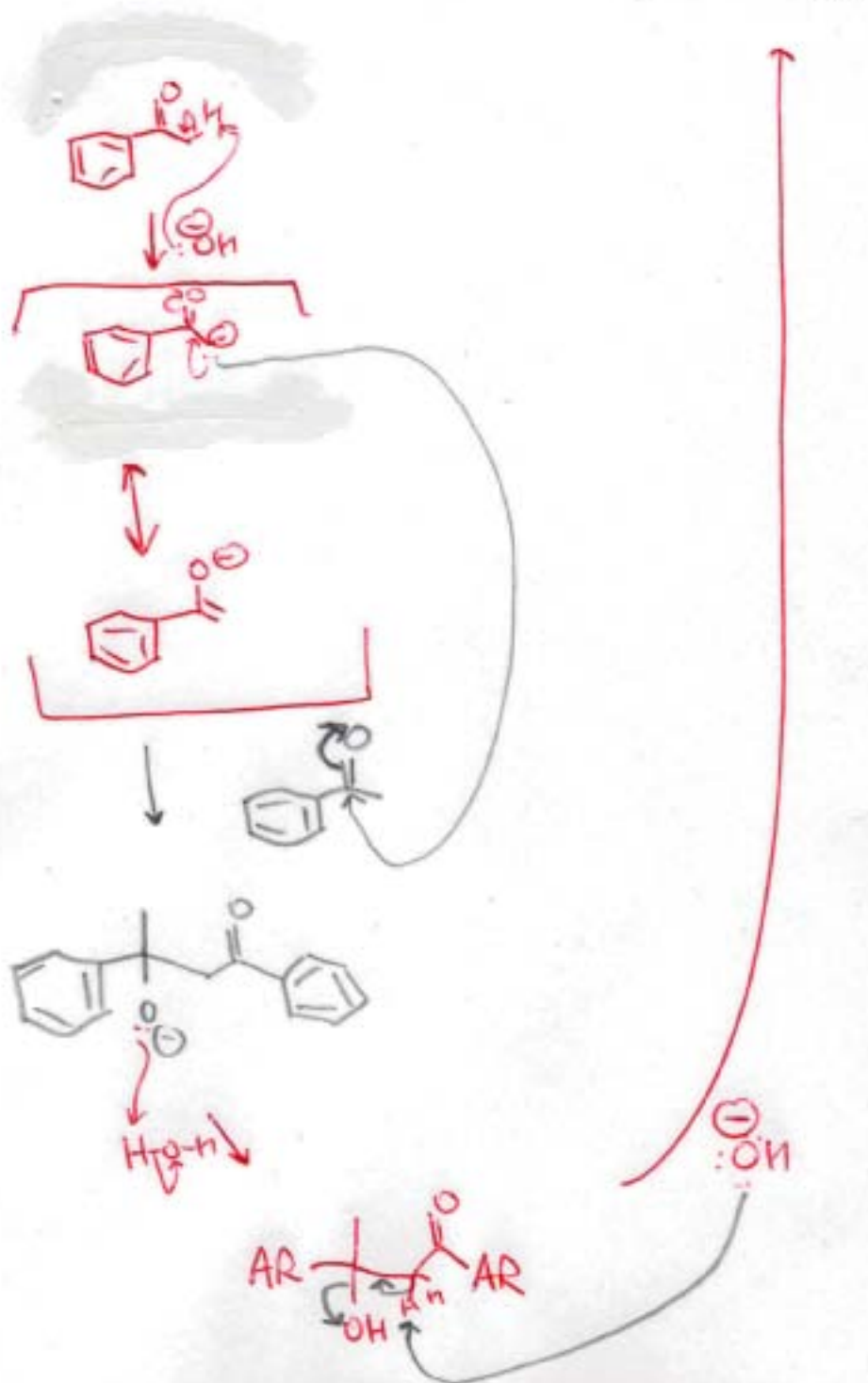
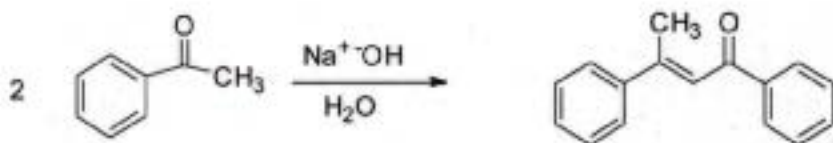
B) (25pts) Draw the mechanism for the following transformation.



C) (25pts) Draw the mechanism for the following transformation.

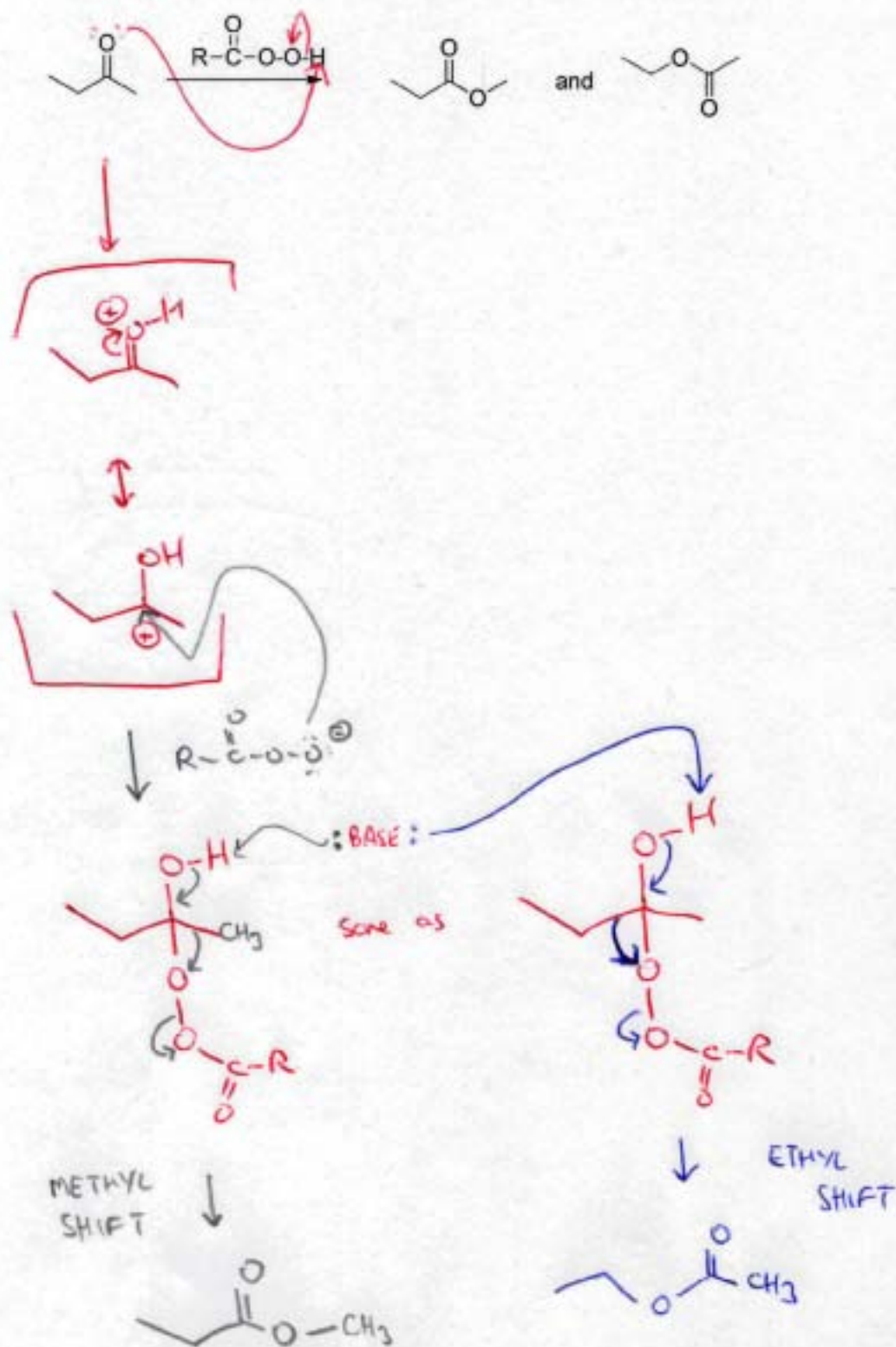


D) (25pts) Draw the mechanism for the following transformation.

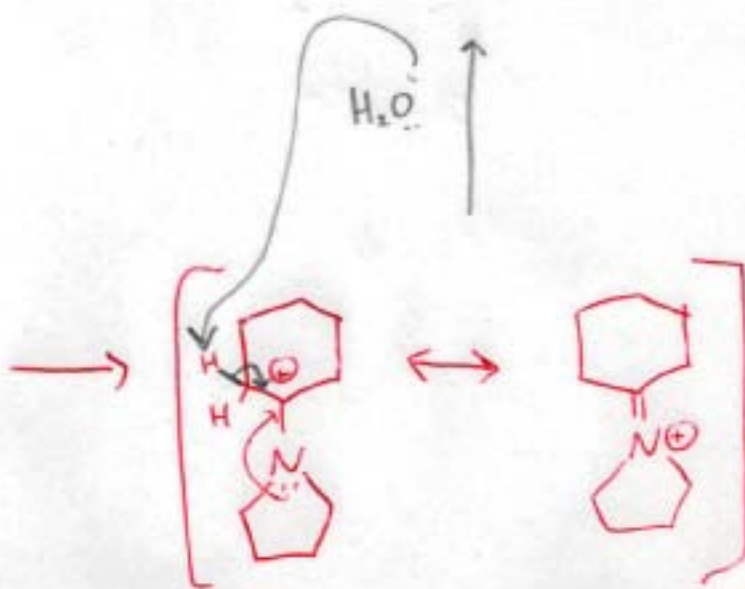
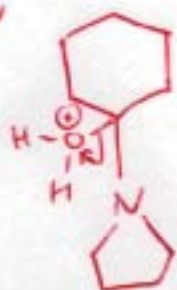
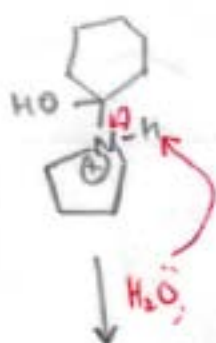
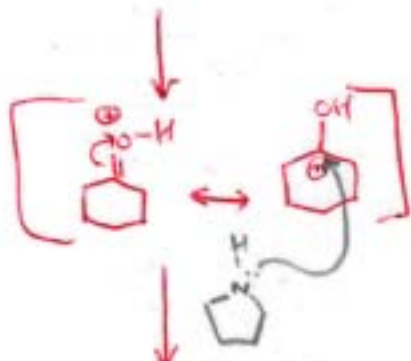
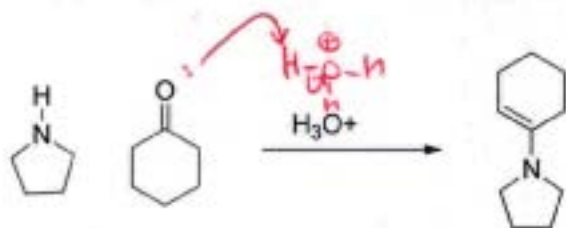




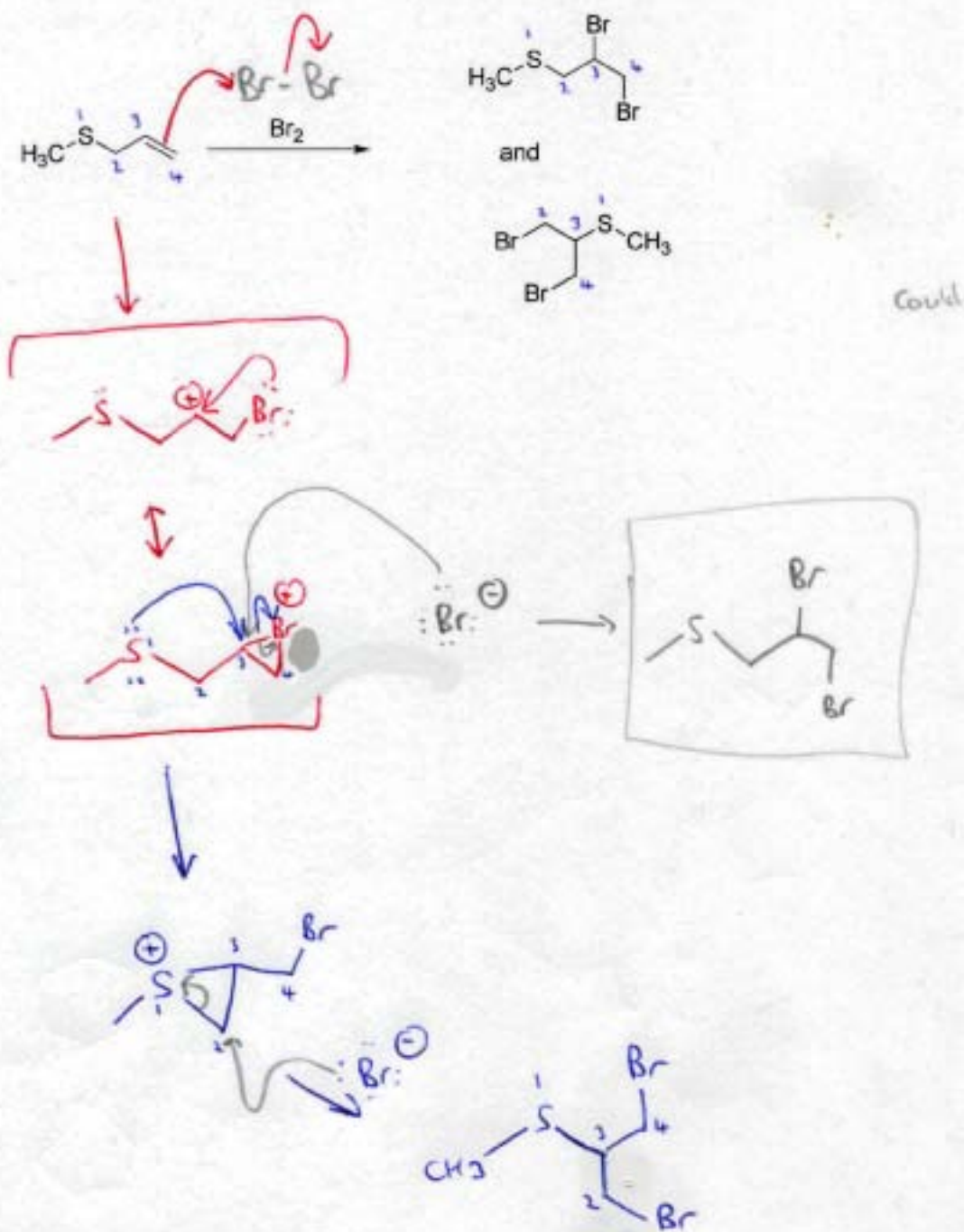
E) (25pts) Draw the mechanism for the following transformation.



F) (25pts) Draw the mechanism for the following transformation.



G) (25pts) Draw the mechanism for the following transformation.



H) (25pts) Draw the mechanism for the following transformation.

