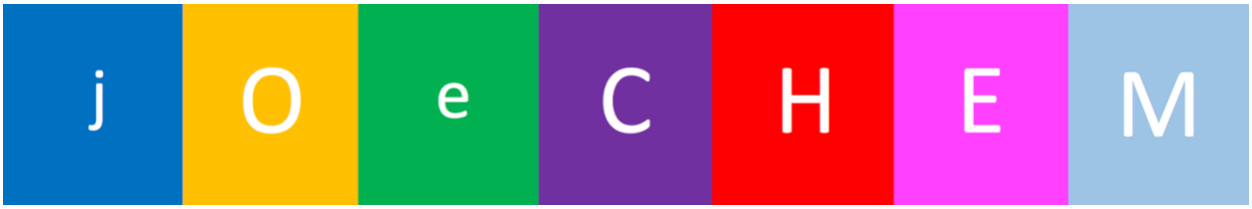
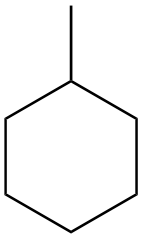
Organic Chemistry I

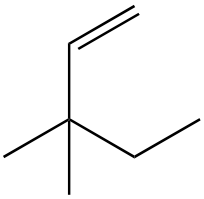
Final Exam



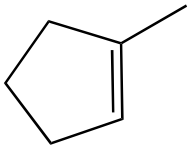
1.) The many reactions below are shown missing their **final product**. For each problem below, correctly predict the final product. If you believe no product is formed/no reaction occurs, write "**NR**".



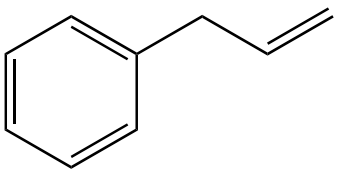
1.) Br_2, hv, heat
2.) LDA



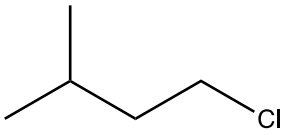
HCl



1.) mCPBA
2.) OH^-, H_2O



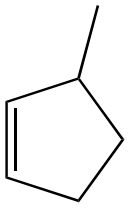
1.) $Hg(OAc)_2$, H_2O
2.) $NaBH_4$



1.) NaOH
2.) PCC
3.) MeMgBr

→

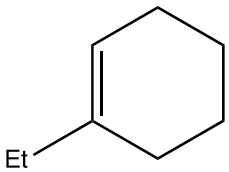
4.) H_3O^+



1.) O_3 , CH_2Cl_2
2.) Zn, CH_3COOH

→

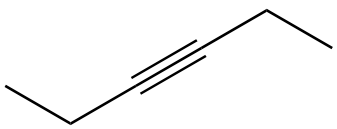
3.) $LiAlH_4$ (excess)
4.) H_3O^+



Cl_2

→

MeOH

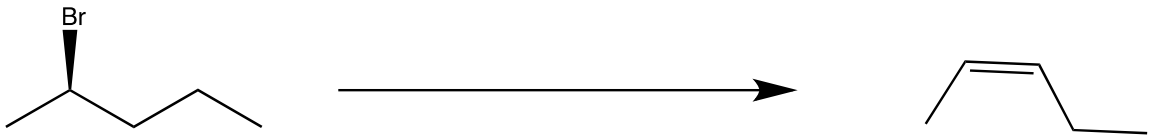


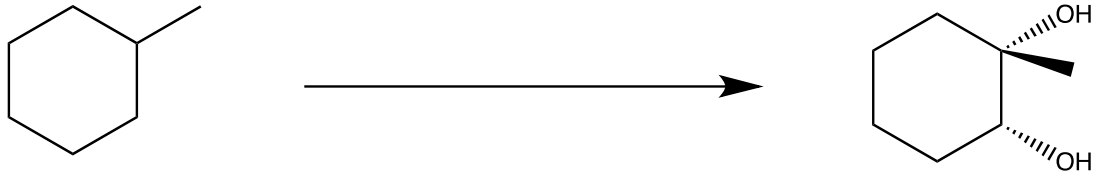
H_2

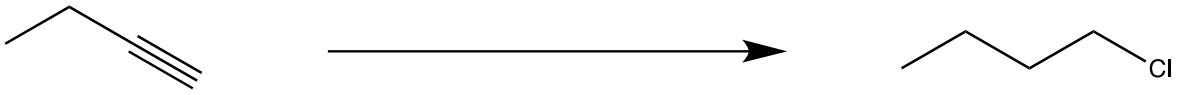
→

Lindlar's

2.) Below various reactants and products are shown. In each reaction, provide the necessary reagents to make the given transformations occur. **Note:** The reactions can possibly require multi-step reagents.

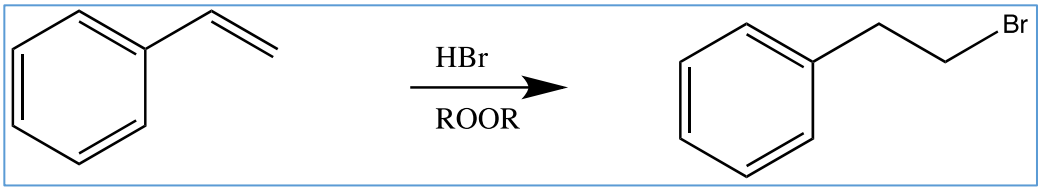




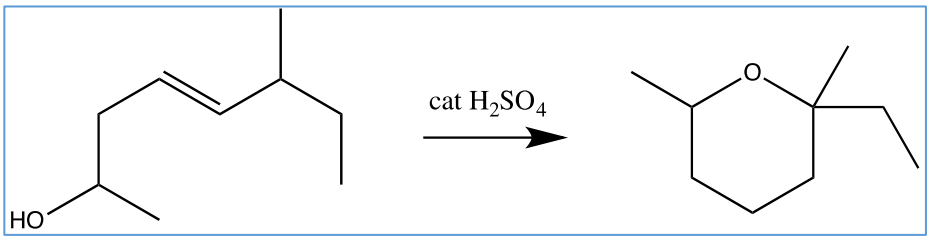


3.) Given the following reaction, draw the complete arrow pushing **mechanism**. Indicate and provide a **BRIEF** explanation as to why this reaction is considered a **chain reaction**.

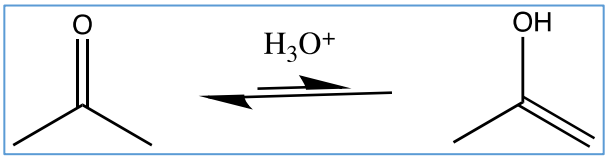
Please include initiation steps



4.) Given the following reaction, draw the complete arrow pushing **mechanism**.



5.) It is known that the **keto** form is favored in Keto-Enol Tautomerism. Shown below is the keto-enol equilibrium exhibited by acetone in an **acidic** environment.

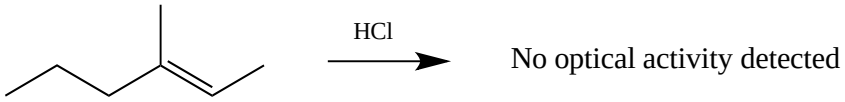


a.) Draw the arrow pushing mechanism that illustrates how acetone's keto form tautomerizes to the enol form (aka, show how the ketone transforms into the enol) in acidic conditions.

b.) Provide a **BRIEF explanation** as to why the keto form is favored over the enol form.

6.) Answer the following questions with your knowledge of stereochemistry:

a.) After performing the Markovnikov Addition of HCl in the reaction below, the product is analyzed with a polarimeter; however, no optical activity is detected. Explain this result.



b.) Can a structure have multiple stereocenters but be achiral? State yes or no, and provide a structural example to support your answer.

c.) Determine the relationship between the 2 molecules depicted below.

7.) Propose an efficient synthesis of 3,4,5-trimethylheptan-4-ol with 2-butene as your only source of carbon. You may use whatever inorganic reagents you may need to complete the transformation.