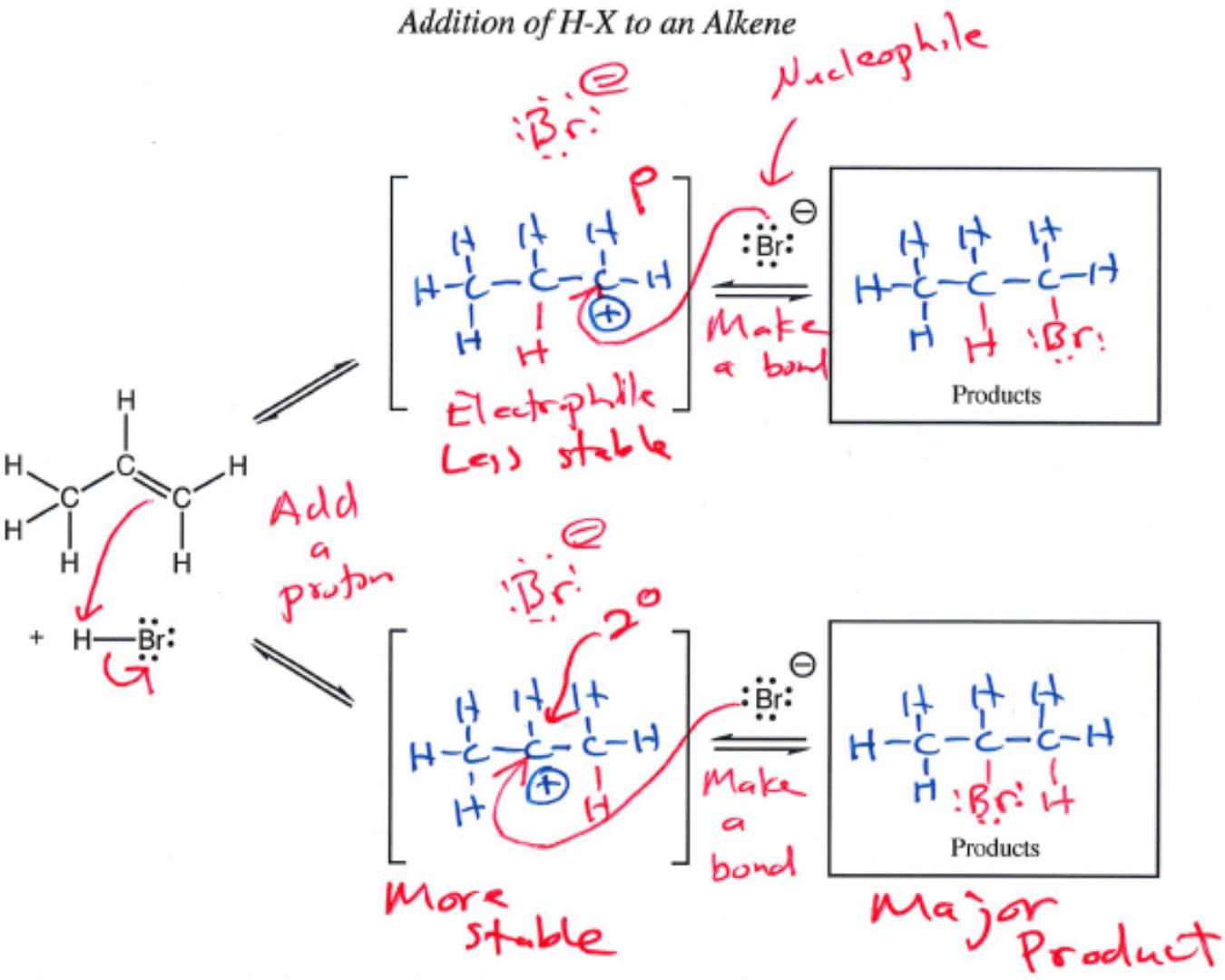
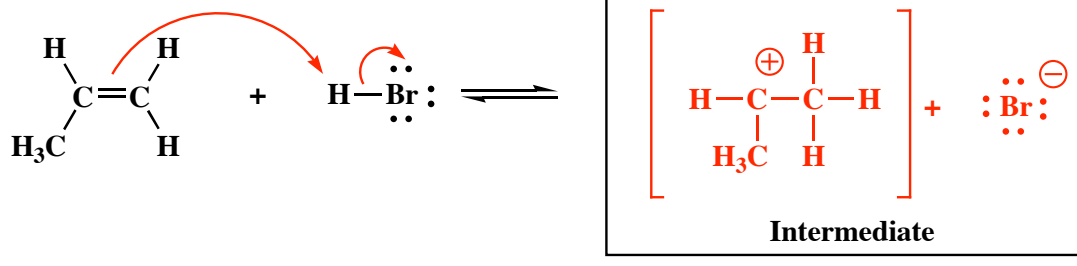


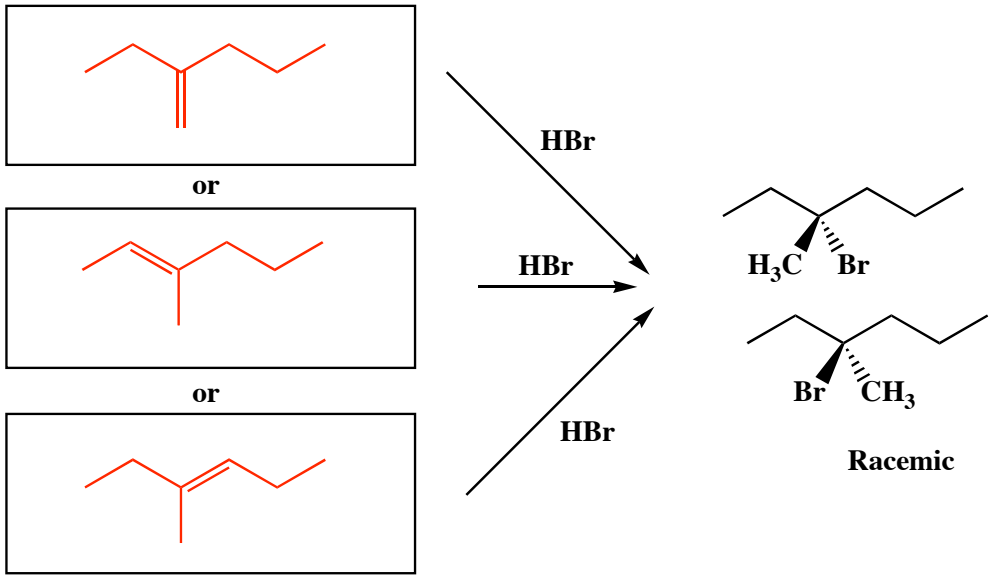
Signature_____ Pg 6 _____(24)

11. (6 pts each) For each set of reagents, draw the important intermediate or transition state that we discussed in lecture in the box provided. **You must show all lone pairs and formal charges on the structures you draw!! Draw all species produced in this step of the mechanism** Next, draw arrows on the starting materials to indicate electron flow to generate the intermediate or transition state that you have drawn. *If the intermediate or transition state is chiral, you only need to draw one of the enantiomers, not both.* Please read these directions again to make sure you know what we want. Note that we are only interested in the first step of the mechanism here, not the whole mechanism!

A.

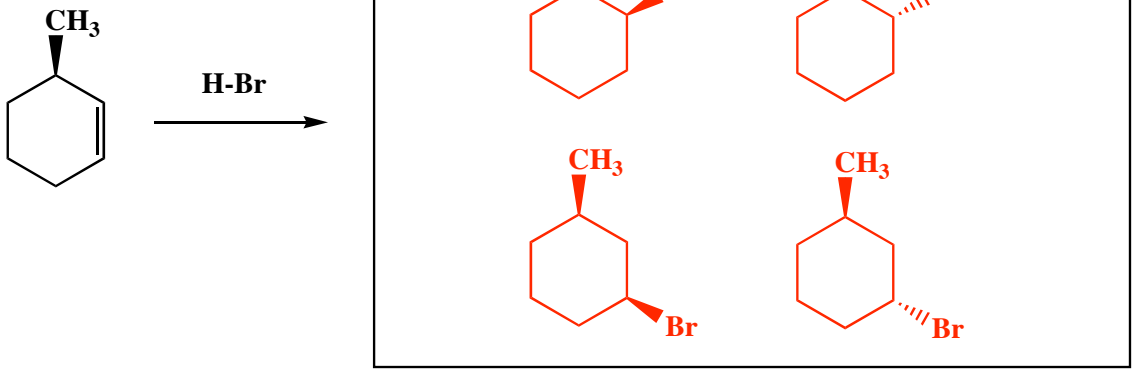


14. (6 pts) Assuming no rearrangements, **draw the three different alkenes that can give rise to the indicated racemic mixture of products with reacted with HBr.**



14. (18 pts) **For the following reaction, draw all possible products including the different regioisomers and stereoisomers**. For this part, assume no rearrangement takes place**.**

A) No rearrangement

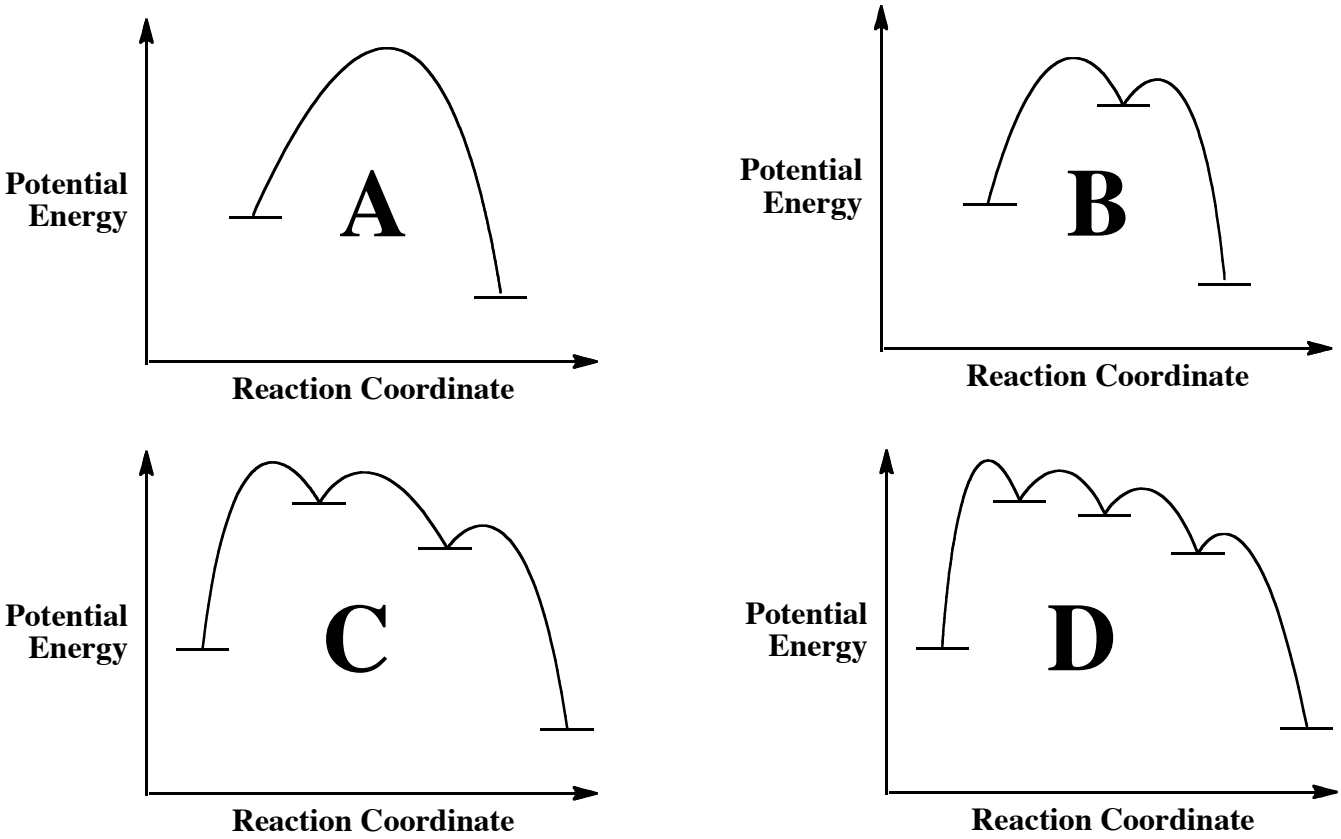


B) In your answer to part A), did you draw any pairs of enantiomers? No

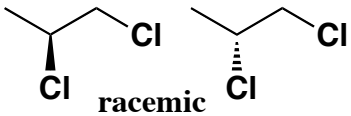
C) Is your answer to part A) a racemic mixture? No

D) Now draw any additional product(s) you would see upon rearrangement of the intermediate carbocation.

11. (8 pts.) Shown below are four different energy diagrams. Each is labeled with a letter. **Use these letters to answer questions at the bottom of the page,** ***and on the next TWO mechansim pages***.



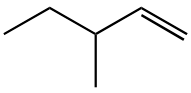
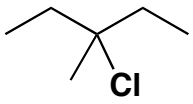
In the boxes provided, write the letter of the energy diagram that best describes the mechanism of the following reactions:

$CH_3CH{=}CH_2 + Cl_2 \longrightarrow$  racemic

B Energy Diagram Letter

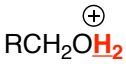
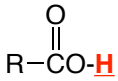
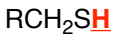
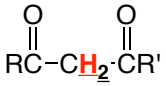
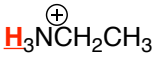
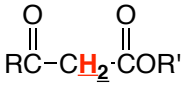
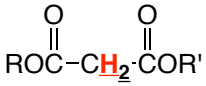
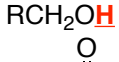
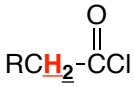
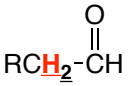
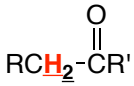
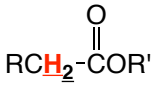
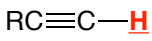
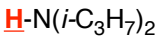
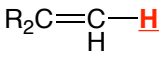
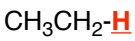
$CH_3CH{=}CH_2 + HCl \longrightarrow CH_3CHClCH_3$

B Energy Diagram Letter

 + HCl $\longrightarrow$ 

C Energy Diagram Letter

(Rearranged!)

Compound		pK_a
Hydrochloric acid		-7
Protonated alcohol		-2
Hydronium ion		-1.7
Carboxylic acids		3-5
Thiols		8-9
Ammonium ion		9.2
β-Dicarbonyls		10
Primary ammonium		10.5
β-Ketoesters		11
β-Diesters		13
Water		15.7
Alcohols		15-19
Acid chlorides		16
Aldehydes		18-20
Ketones		18-20
Esters		23-25
Terminal alkynes		25
LDA		40
Terminal alkenes		44
Alkanes		51