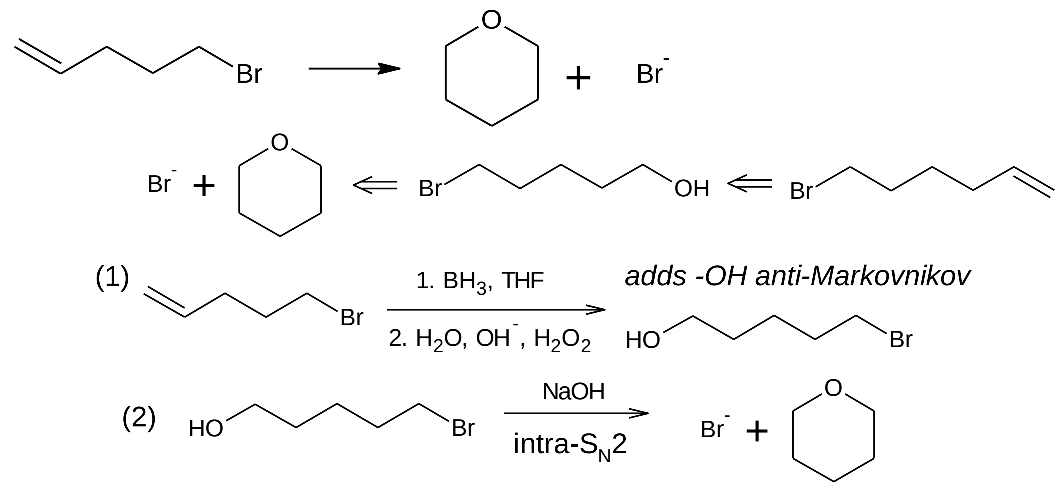
PRACTICE EXAM #4 (Ch. 7-9)

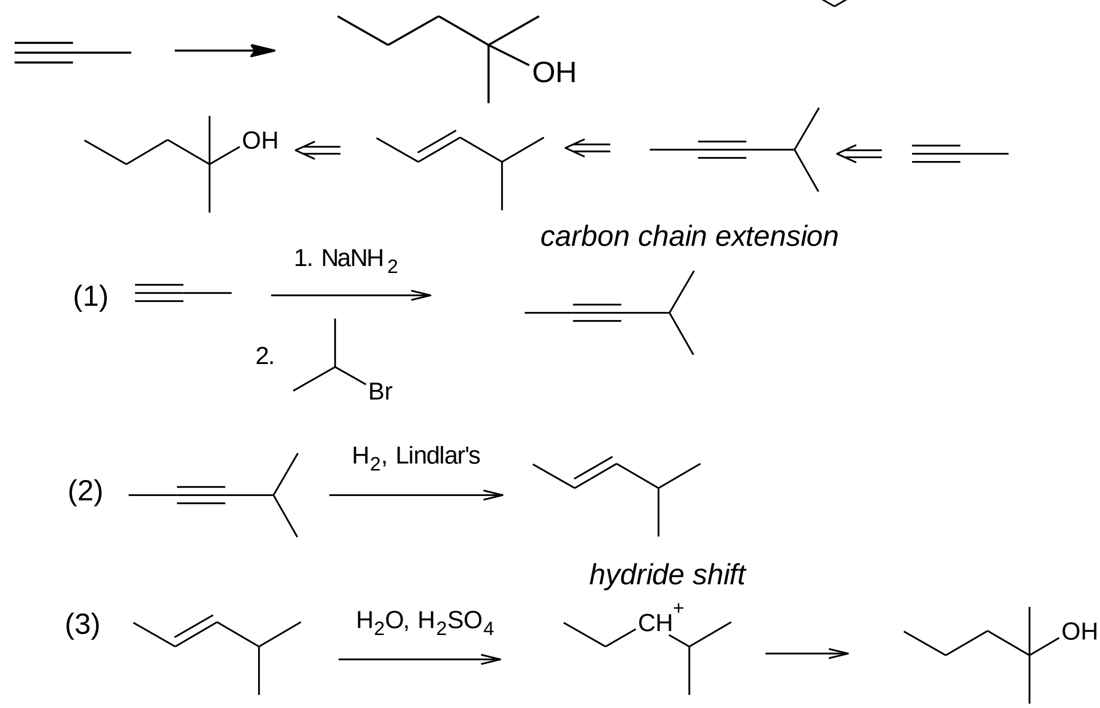
ChemV12A, Organic Chemistry I

1.) Propose a synthesis and clearly describe the reactions and reagents needed to convert the following reactants to their indicated products. (40 pts, 20 pts ea)

a.)



b.)



2.) Which is more stable: a vinylic or an allylic carbocation? Why? (11 pts)

vinylic allylic

Allylic. The allylic carbocation has a resonance structure that can **delocalize** the positive charge between two carbons. The vinylic carbocation has no possible resonance so the positive charge is **localized** on an sp^2-carbon that is already **partially positive** due to the π-bond.

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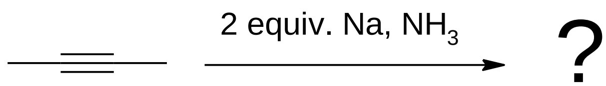
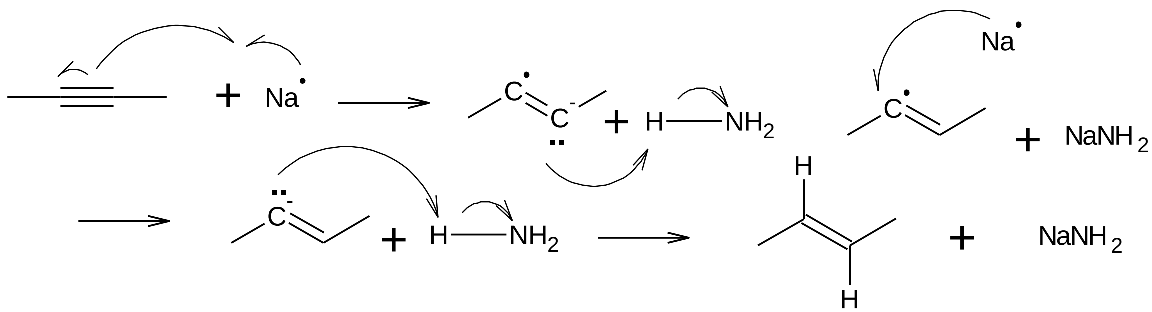
3.) Show the arrow-pushing mechanisms for the following reactions including correct **stereochemistry** (wedges/dashes, cis/trans) if applicable. (40 pts, 20 pts ea)

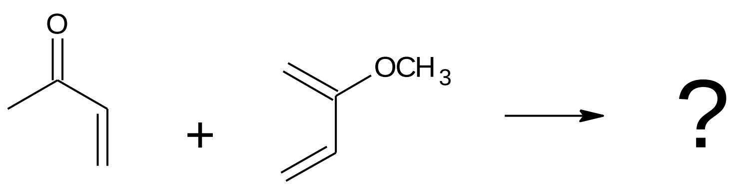
a.)

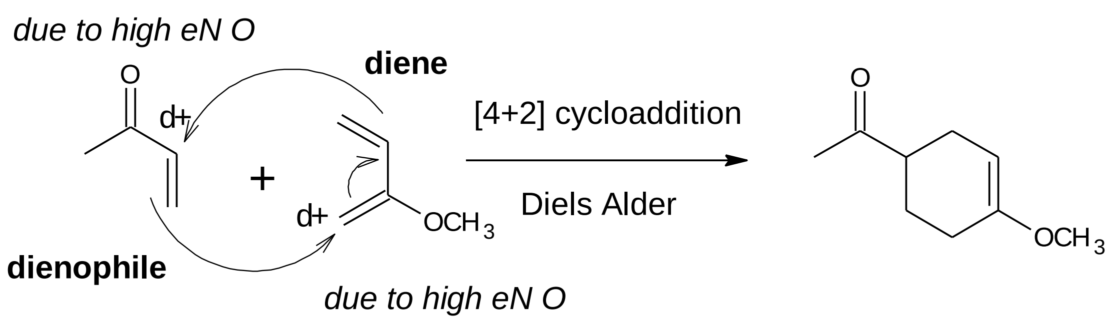




trans-2-butene

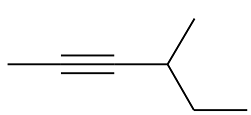
b.)



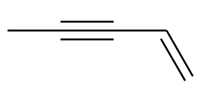


4.) Draw the line-angle structures for: (10 pts, 5 pts ea)

a.) 4-methyl-2-hexyne

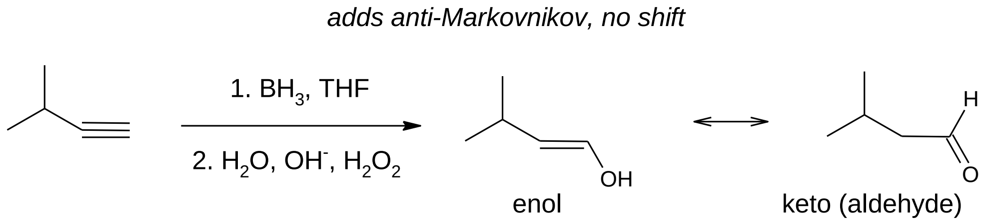


b.) pent-1-en-4-yne

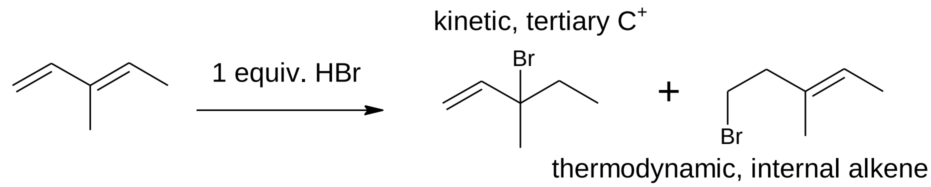


5.) Give the structures of the **major** product(s) for the following compounds. If there is both a **kinetic** and **thermodynamic** product, show both and clearly label each. Show both **tautomers** if keto/aldo-enol tautomerization is present. (32 pts, 8 pts ea)

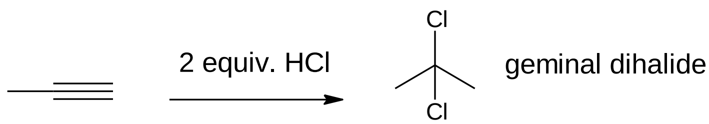
a.)

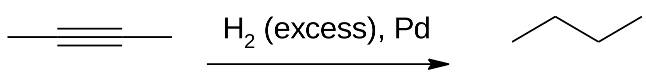


b.)



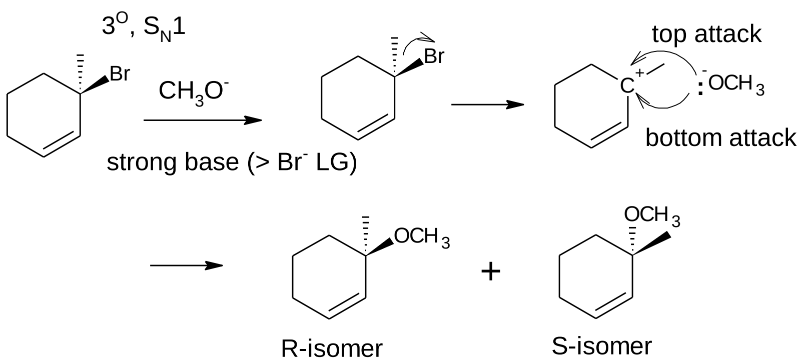
c.)



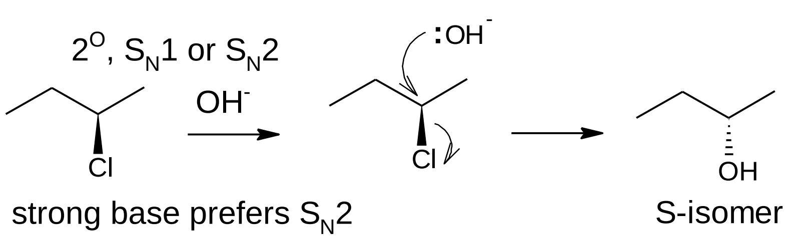


d.)

6.) For each of the following substitution reactions, state whether they are more likely to undergo **SN1** or **SN2** mechanisms and **why**. Then show the **mechanism** and the **major** product(s), including correct **stereochemistry** (wedges and dashes). If the products are **chiral**, label them R or S appropriately. (32 pts, 16 pts ea)



a.)



b.)