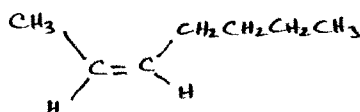


I. Fill in the blanks

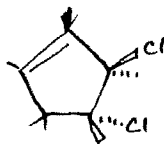
1. Calculate the number of hydrogens found in any pentene molecule 10 C_5H_{10} - specify monoene
2. Give the general formula for an alkyne C_nH_{2n-2} specify monoalkyne
3. An alkene's double bond is formed by sp^2 hybridized carbons.
4. What types of bonds and how many are found in a triple covalent bond? $1\sigma + 2\pi$
5. Why don't cycloalkynes exist? alkynes are made from sp hybridized carbons - linear (180°) can't be in ring
6. The stable intermediate found in most alkene addition reactions is called a(n) carbocation
7. State Markovnikov's rule nucleophiles are added on more substituted carbons in the alkene; due to higher stability in carbocation
8. What type of reaction mechanism do most aromatics experience? electrophilic substitution
9. What is a nucleophile? a compound that is attracted to nuclei; usually anions or polar covalent
10. What is the difference between an R enantiomer and an S enantiomer? direction of priority about chiral carbon
R - clockwise S - counter clockwise

II. Draw structural formulas for the following: NEATNESS will be heavily considered during grading.

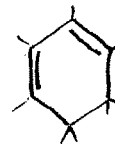
11. cis-2-Heptene



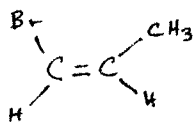
12. trans-3,4-Dichlorocyclopentene



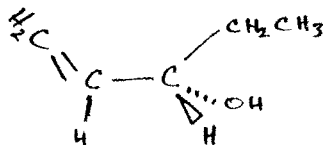
13. 1,3-Cyclohexadiene



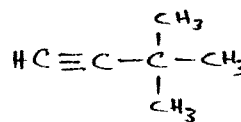
14. (Z)-1-Bromopropene



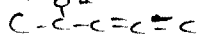
15. (S)-3-Hydroxy-1-pentene



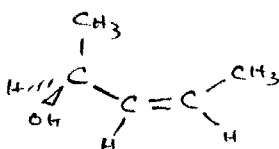
16. 3,3-Dimethyl-1-butyne



Given: (S)-4-Hydroxy-cis-2-Pentene, answer the following questions. Again neatness is an important consideration.



17. Draw the structural formula



18. Draw a constitutional isomer for:

change position of double bonds,
hydroxyl group + chain

19. Draw a diastereomer for:

change cis/trans

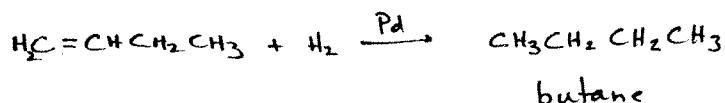
20. Draw an enantiomer for:

change R/S

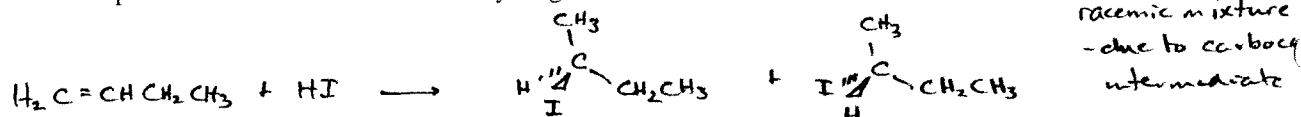
21. Give the names for #18, #19, & #20

Given: 1-Butene

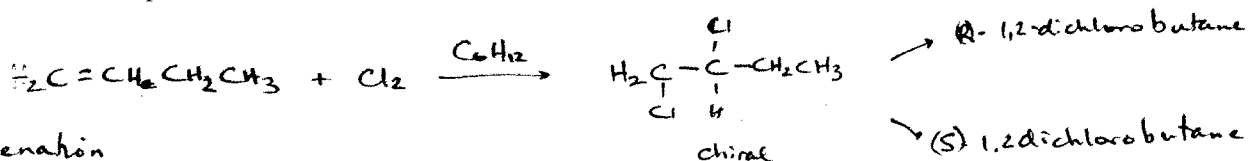
22. Draw/name the product from a hydrogenation reaction



23. Draw/name the product from the reaction with hydrogen iodide

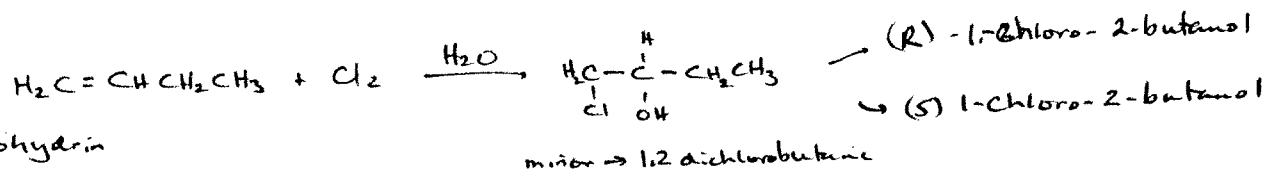


24. Draw/name the product from the reaction with chlorine gas using cyclohexane as the solvent



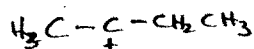
halogenation

25. Draw/name the product from the reaction with chlorine gas using water as the solvent.

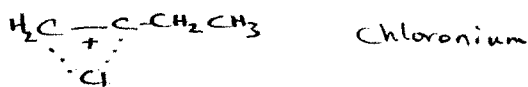


halohydrin

26. Draw the intermediate structure for # 23



27. Draw the intermediate structure for # 24



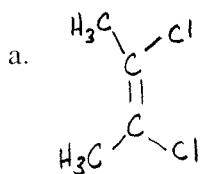
28. What is the general name of the intermediate formed in # 24?

Chloronium

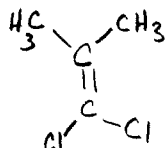
29. I have plans of reacting water with 1-Butene to produce 2-Butanol. What kind of catalyst will I need?

H_2SO_4 or H_3PO_4

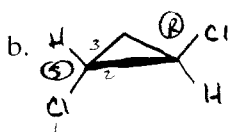
30. Identify the following pairs as diastereomers, enantiomers, same molecule, constitutional isomers or different molecules.



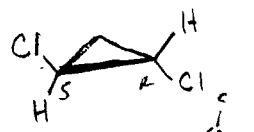
and



Constitutional

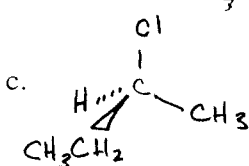


and

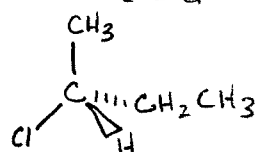


enantiomers

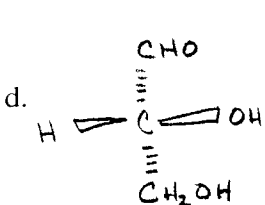
non-superimposable mirror images.



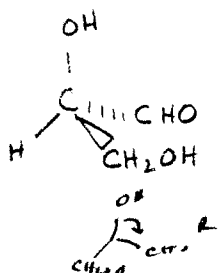
and



enantiomers

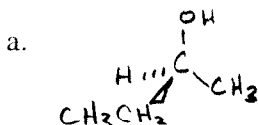


and

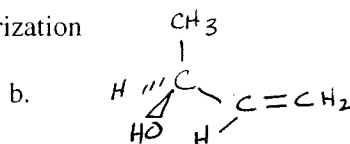


Same molecule

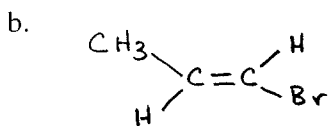
31. Name the following molecules. Pay close attention to isomerization



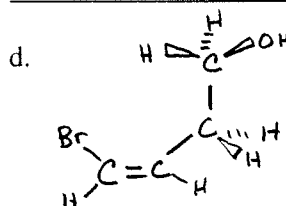
(S)-2-butanol



(S)-3-penten-2-ol



E-1-bromopropene



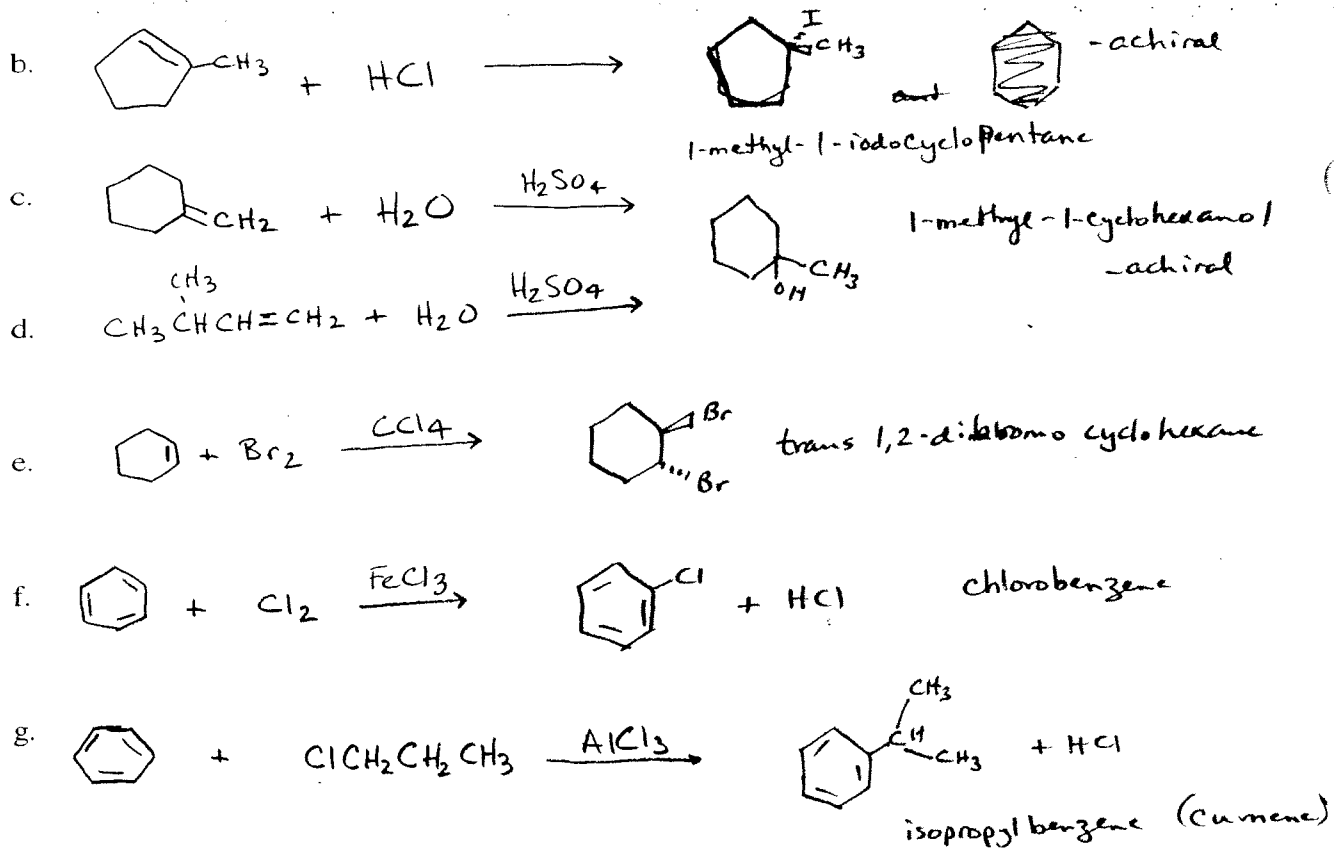
Z-4-bromo-3-penten-1-ol

32. Predict the products by drawing correct structural formulas and name them

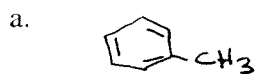


2-methyl-2-iodopropane

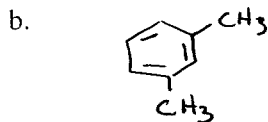
-achiral $\Rightarrow$ no R/S production



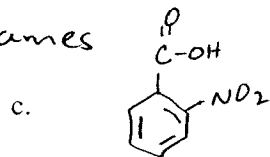
33. Name the following aromatic compounds using IUPAC and common names



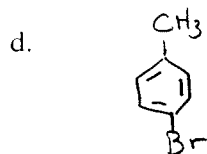
methylbenzene toluene



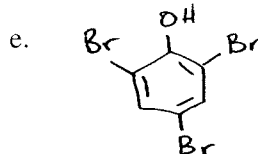
1,3-dimethylbenzene m-xylene



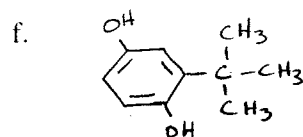
2-nitrobenzoic acid
no common name



1-bromo-4-methylbenzene
p-bromotoluene



1,3,5-tribromo-2-hydroxybenzene
tribromophenol



2-tertbutyl-1,2-dihydroxybenzene
t-butylhydroquinone

34. Draw the steps for the bromination of toluene. Be sure to include fishhook arrows that represent electron movements. Your final product should be the isomer that is produced at the highest percentage.

