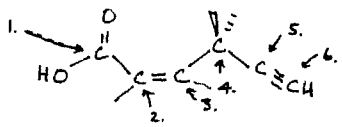
Adv. Chemistry: Ch. 13. Alkenes & their reactions

Name: _____

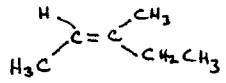
1. Write the general formula for a monounsaturated, non-cyclic alkene C_nH_{2n}.

2. In the following compound, identify the hybridization of each carbon atom:

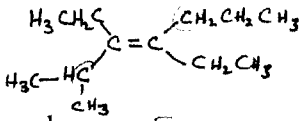
1. sp^2 3. sp^2 5. sp
2. sp^2 4. sp^3 6. sp



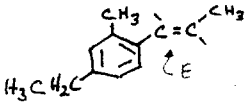
3. Identify the following isomers as E or Z diastereomers.



a. Z



b. E



c. E

4. A mixture that contains equal concentrations of enantiomers is called a racemic mixture.

5. Put these alkene substituents in order of priority, as consistent with Cahn-Ingold-Prelog convention. (→ lowest to highest)
-CH3, -CH2OH, -CH=CH2, -OH, -SH, -COOH → $-CH_3$, $-CH=CH_2$, $-CH_2OH$, $-COOH$, $-OH$, $-SH$

6. A reaction having higher activation energy attends a [higher/(lower)] reaction rate. (Circle one)

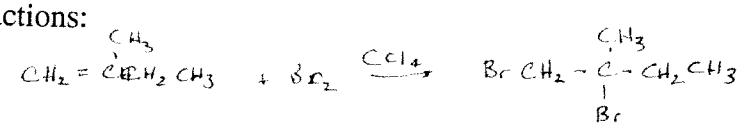
7. Alkenes function as [electrophiles/(nucleophiles)]. (Circle one)

8. Define Lewis Acid: Any material that functions to accept a pair of electrons

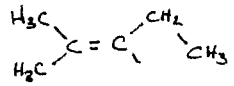
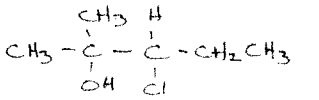
9. Define regioselectivity: A reaction where one structural isomer is preferred over another based on structural properties of the compounds/transition components involved

10. A common intermediate in alkene addition reactions is called a(n) carbocation

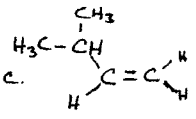
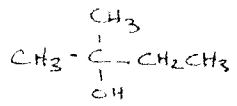
11. Write out the products for the following reactions:

a. 2-methyl-1-butene + Br_2 $\xrightarrow{CCl_4}$ 

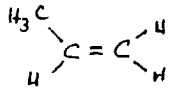
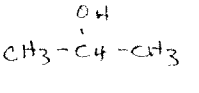
1,2-dibromo-2-methylbutane

b.  + Cl_2 $\xrightarrow{H_2O}$ 

3-chloro-2-methyl-2-pentanol + hydrogen chloride (hydrochloric acid)

c.  + H_2O $\xrightarrow{H_2SO_4}$ 

2-methyl-2-butanol

d. 
1. $Hg(OAc)_2$, THF/H_2O
2. $NaBH_4$, OH^-


2-propanol

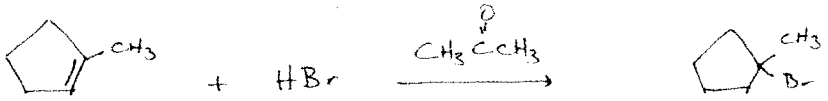
- follows markovnikov but prevents 1,2-shifting

+ Hg^0 (elemental mercury) + NaC_2H_3COO (Sodium acetate) + BH_3 (Borane)

(Some CH_3COOH - because acetic acid is a weak acid)

12. On the back side, Draw out the mechanism for the reaction between 1-methylcyclopentene and hydrogen bromide in acetone.

Overall :



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1-bromo-1-methylcyclopentane