Homework - Chapter 12 Chem 2320

Name _____

I. Addition reactions of alkenes

1. Label the following reactions as a substitution, addition, or elimination.



2. What reagents would give the following products?



2. Give the products of the following reactions.



3. Give five isomers with the molecular formula C_6H_{12} that will react with H_2 and Pd/C to give hexane.

4. Give the product of each of the following reactions.

a)
$$\underbrace{KMnO_4}_{H_2O, KOH}$$

b)
$$\underbrace{OsO_4, H_2O_2}_{H_2O_2}$$



6. Give the products of the following reactions.



HW Ch 12 p 4

7. What alkene could be reacted with peroxybenzoic acid to give the following epoxides?



8. Give the products of the following reactions.



9. Give the product for each of the following reactions.



10. What starting material and reagents could be used to prepare each of the following products?



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11. Show the polymer that would be formed in the following reactions.



12. Show the mechanism by which polybutylene could be made using a carbocation mechanism. Build a polymer three units long, showing all steps. (Note that this reaction will require heat, since the carbocation is secondary.)



13. What alkene could be used to synthesize each of the following polymers?





14. Write out the reaction which will occur when 1-ethyl-1-cyclopentene is treated with each of the following.

a) osmium tetroxide and hydrogen peroxide

b) diiodomethane and copper-zinc couple

c) mercuric acetate and water, followed by sodium borohydride

d) peroxybenzoic acid

e) hydrogen gas and palladium on carbon

f) borane-THF followed by hydrogen peroxide and hydroxide

g) chlorine gas

h) hydrochloric acid

i) potassium permanganate, water, and sodium hydroxide

j) chloroform and potassium tert-butoxide

k) hydrobromic acid with a trace of organic peroxide

l) diazomethane and heat

m) phosphoric acid and water

n) iodine and water

II. Stereochemistry of alkene addition reactions

15. Give all stereoisomers that would result from the following reactions.



IV. Oxidative cleavage of alkenes

16. Give the product of each of the following reactions.



17. Which of the previous reactions above would give a different product if reacted with ozone followed by hydrogen peroxide? For those that will, draw the new products.

a) d)

b) e)

c)

18. What alkene would give the following products after ozonolysis?



V. Synthesis using alkene reactions

19. Fill in the starting material and reagent to form each of the following products.





20. Three different types of peroxide are used in alkene reactions. Explain what each is useful for.



- c) H₃C^OCH₃
- 21. Explain where each of the atoms that is added to the C=C comes from in the following reagents.

