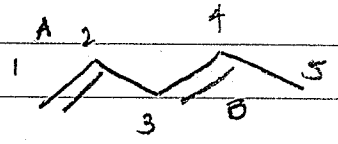
PROBLEM SET #8

SOLUTIONS

14.2, 14.3, 14.20, 14.

14.2



1,3-pentadiene

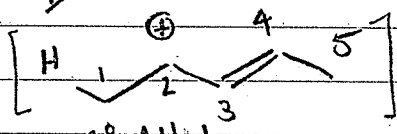
1 eq. HCl →

Use the approach outlined in lecture to solve ....

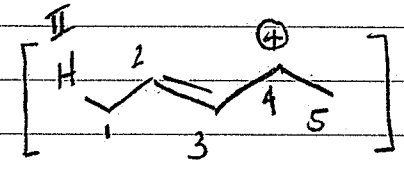
"ADDUCT" means PRODUCT

CARBOCATIONS:

A: I



2° Allylic



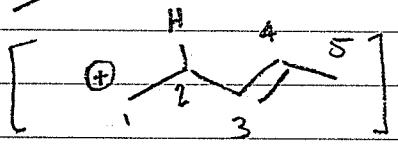
II

2° Allylic

FOR A:

There are three possible carbocations but only 2 unique products IA and IIA are the same

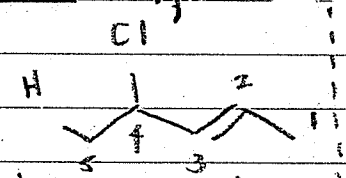
III



1° Alkyl

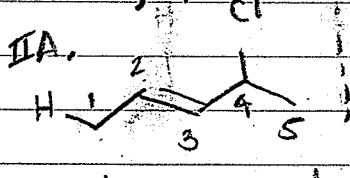
PRODUCTS

IA 1,2-



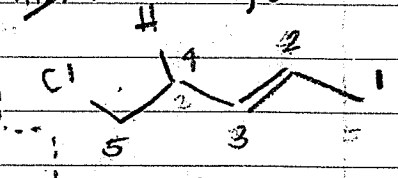
4-chloro-2-pentene

IIA. 1,4-



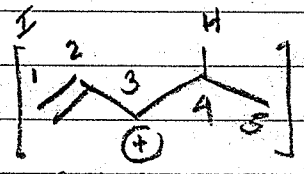
4-chloro-2-pentene

IIIA. 1,2-

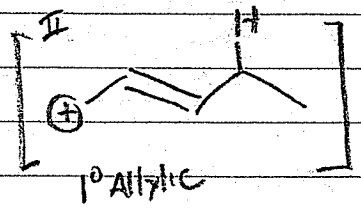


5-chloro-2-pentene

B:



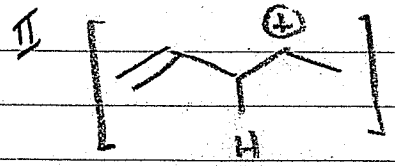
2° Allylic



II

1° Allylic

II

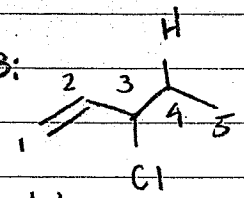


2° Alkyl

FOR B: There are 3 possible carbocations and 3 products,

PRODUCTS:

IB:

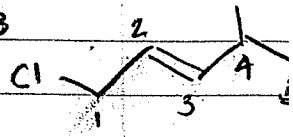


3-chloro-1-pentene

1,2

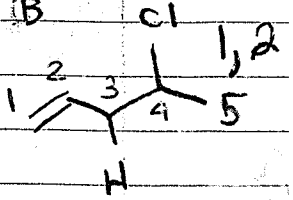
1,4-

IIB



1-chloro-2-pentene

IIIB



1,2

4-chloro-1-pentene

1,2 PRODUCTS

1,2 products are those that have the H of HCl and the Cl of HCl on CONSECUTIVE carbons of the parent chain in the product, regardless of the numbering used in the name of the product (So 1,2 or 2,3 or 4,5 all are considered to be 1,2)

1,4 PRODUCTS

1,4-products are those that have the H and Cl of H-Cl on carbons in the product that have a 1,4 RELATIONSHIP. To identify a 1,4-product number the carbon bonded to the Cl as #1. Number carbons consecutively over to the the carbon bonded to the H of HCl. If the H is on the #4 carbon in this numbering scheme, then the product is 1,4-

14.3 The assumption is that the electrophilic addition is KINETICALLY controlled when it is not specified. Since it is not specified, kinetic conditions are assumed.

Under kinetic conditions, the most stable carbocation predominates.

Carbocations IA and IIA are 2° Allylic and IB is also 2° Allylic. These are the most stable carbocations that can be generated in this reaction.

Carbocations IA and IB give 1,2 products, IIA gives a 1,4 product.

14.20

a. $CH_3-CH=C(CH_3)-CH=CHCH_3$ (1 2 3 4 5 6)

Find parent chain
Parent is the longest continuous carbon chain containing both alkene functional groups

Number the chain to give the alkene carbons the lowest possible numbers, then so the substituent(s) has the lowest possible number
In this case, numbering may start at either end of the carbon chain - the result is the same either way

Write the parent root; HEXA (6-carb
Add the functional group suffix : HEXADIENE
↑ two ↑ alke

Add numbers indicating the position of the alkenes in the parent : 2,4-HEXADIENE

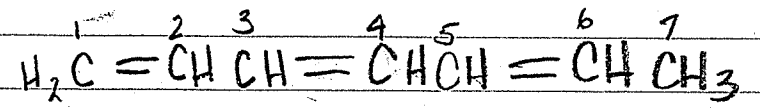
Add the substituent prefix : METHYL-2,4-HEXADI

Add number to indicate position of substituent: 3-METHYL-2,4-HEXADIE
on parent chain

Note: HYPENS separate numbers and text
COMMAS separate numbers

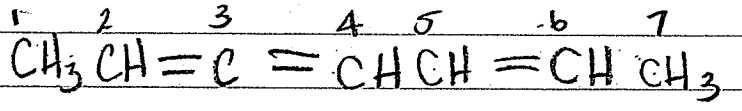
14.20 (cont'd)

b.



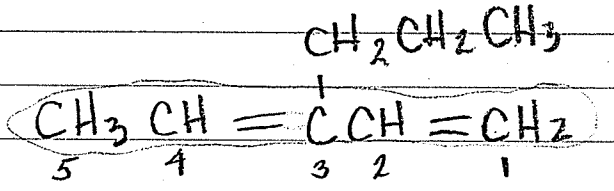
1,3,5-HEPTATRIENE

c.



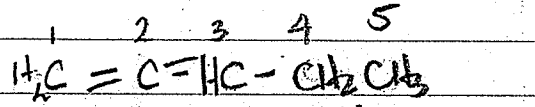
2,3,5-HEPTATRIENE

d.

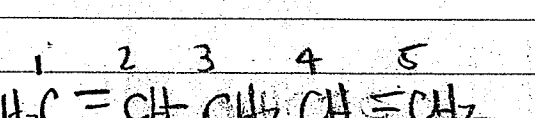


3-PROPYL-1,3-PENTADIENE

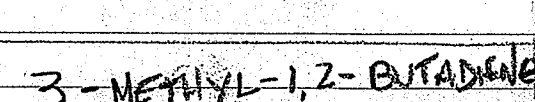
14.21 C_5H_8



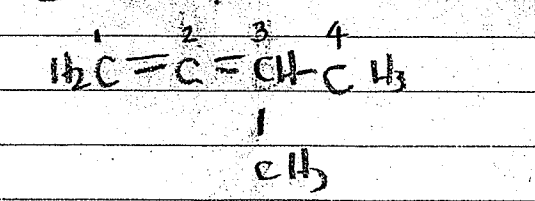
1,2-PENTADIENE

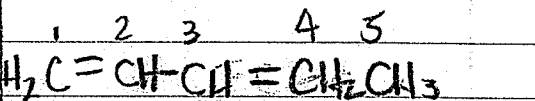


1,4-PENTADIENE

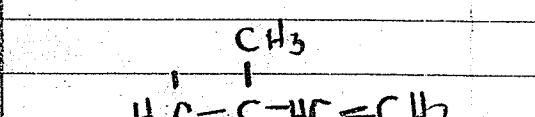


3-METHYL-1,2-BUTADIENE

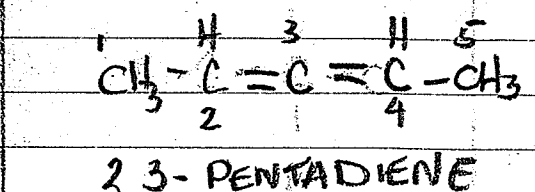




1,3-PENTADIENE



2-METHYL-1,3-BUTADIENE



2,3-PENTADIENE