Chemistry 11

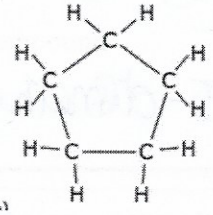
Organic Chemistry III

Name: Key.
Date:
Block:

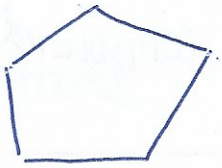
1. Cycloalkanes
2. Aromatic Rings

Cycloalkanes

- Carbon atoms may bond to each other and form a Cyclic structure



becomes



- General Formula: C_nH_{2n} * cyclo-

# of C Atoms	Prefix	Cycloalkane	Formula
1	Meth-	not possible	
2	Eth-	not possible	
3	Prop-	cyclopropane	C_3H_6
4	But-	cyclobutane	C_4H_8
5	Pent-	cyclopentane	C_5H_{10}
6	Hex-	cyclohexane	C_6H_{12}
7	Hept-	cycloheptane	C_7H_{14}
8	Oct-	cyclooctane	C_8H_{16}
9	Non-	cyclononane	C_9H_{18}
10	Dec-	cyclodecane	$C_{10}H_{20}$

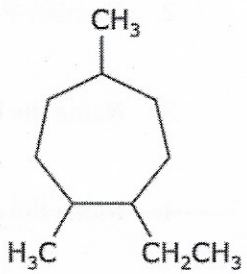
Steps to Naming Cycloalkanes:

1. The ring that contains the greatest number of carbon atoms is the parent chain

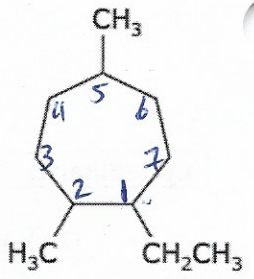
- prefix "cyclo" is place before the parent chain.

Parent Chain =

cycloheptane



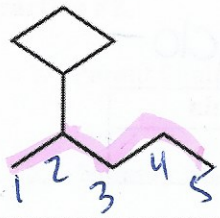
2. The carbon atoms are numbered either clockwise or counter-clockwise.
   - the lowest numbers are used to identify the placement of the branches



3. Name the branches
   1- ethyl
   2,5 - dimethyl

4. Name the compound.
   1-ethyl-2,5-dimethylcycloheptane

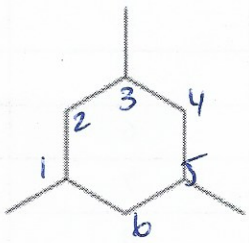
If the ring structure is not the longest continuous carbon chain, then it is named as a branch with prefix "cyclo" and ends in "yl."



Parent: pentane
Branch: 2-cyclobutyl
Compound: 2-cyclobutylpentane

Practice #1.

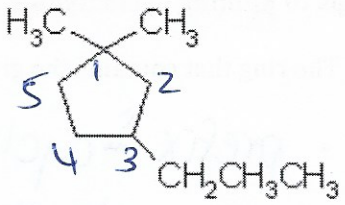
1. Parent Chain.
   cyclohexane
2. Number the parent chain.



3. Name the branches.
   1,3,5-trimethyl
4. Name the compound
   1,3,5-trimethylcyclohexane

Practice #2.

1. Parent Chain.
   cyclopentane
2. Number the parent chain.

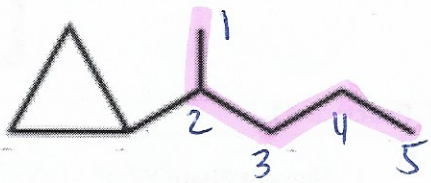


3. Name the branches.
   1,1-dimethyl
   3-propyl
4. Name the compound
   1,1-dimethyl-3-propylcyclopentane

Practice #3.

1. Parent Chain.

pentane



2. Number the parent chain.

3. Name the branches.

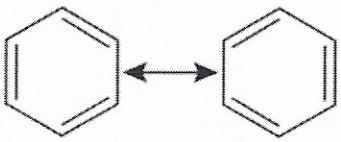
2-cyclopropyl

4. Name the compound

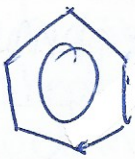
2- cyclopropyl pentane

Aromatic Rings

- An aromatic hydrocarbon, or benzene, is a hydrocarbon with six carbon atoms in a ring
- It has the molecular formula C_6H_6
- The electrons in a benzene molecule are spread out across multiple atoms, so there is more than one way to draw its Lewis structure
- equivalent lewis structures are called resonance structures

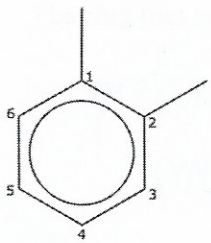


can also be drawn as



Steps to Naming Aromatic Rings:

- Same as other naming procedures! Except... parent chain is called: benzene



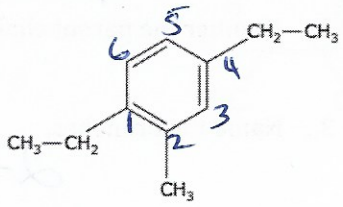
1,2 - dimethyl benzene

Some organic compounds have benzene as a branch.

In this case, the branch name is "phenyl"

Practice #1.

1. Parent Chain. benzene
2. Number the parent chain.

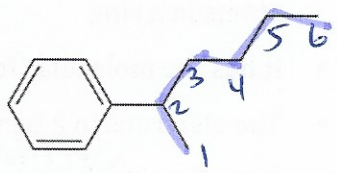


3. Name the branches. 1,4-diethyl
   2-methyl
4. Name the compound

1,4-diethyl-2-methyl benzene

Practice #2.

1. Parent Chain. hexane
2. Number the parent chain.

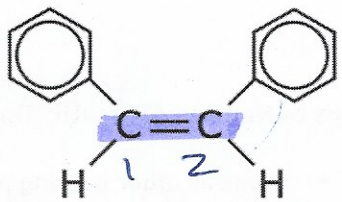


3. Name the branches. 2-phenyl
4. Name the compound

2-phenyl hexane

Practice #3.

1. Parent Chain. (remember alkene and alkyne will be main parent chain)
   cis ethene
2. Number the parent chain.



3. Name the branches. 1,2-diphenyl
4. Name the compound

cis-1,2-diphenyl-1-ethene