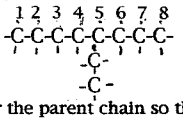
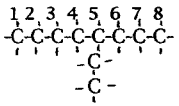
Alkanes - C_nH_{2n+2}

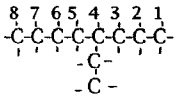
Naming rules:

1. Name the longest continuous chain of carbons (called the parent chain). The name is the prefix for the # of Carbons + -ane ending.

Ex:  8C = oct + ane = octane

2. Number the parent chain so that a branch has the lowest possible number. Identify the branch C.

Ex:  (not correct) branch at 5

Ex:  (correct) branch at 4

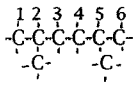
3. Name the branch by using the prefix for the number of carbons which make up the branch and add the -yl ending.

Ex: There are 2 C off the #4 branch carbon, so the branch name would be eth + -yl , ethyl.

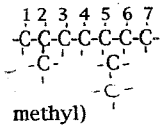
Final name: 4 - ethyloctane

4. What about multiple branches? You must use a number identifying the location of each and every branch (also a prefix for how many branches of one type are present.) If there are different kinds of branches they go in alphabetical order. Look at examples.

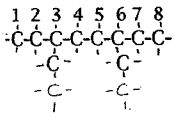
5. Parts of a name: a) where branch is b) how many branches (not always used) c) name of branch d) name of parent chain



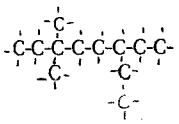
2,5 - ditmethylhexane



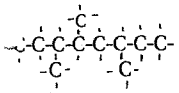
5 - ethyl -2 - methylheptane (ethyl before methyl)



3,6 - diethyloctane



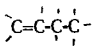
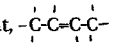
6-ethyl -3,3 - dimethyloctane



3,4, 6 - trimethyloctane

Alkenes - C_nH_{2n}

The naming of alkenes (hydrocarbon with double bonds) is very similar to naming alkanes, except: (1) the name is #C in longest continuous chain with an -ene ending (2) the double bond's location is identified (using the lowest possible number).

Example:  1-butene but,  is 2-butene

2.2 Practice Problems

Give the IUPAC name for the following molecules:

1. $CH_3-CH(CH_3)-CH_2-CH_2-CH_2-CH_2-CH_2-CH_3$

2. $CH_3-CH_2-CH_2-CH(CH_2-CH_3)-CH_2-CH_2-CH_2-CH_2-CH_3$

3. $CH_3-CH_2-CH(CH_2-CH_2-CH_2-CH_3)-CH_2-CH_2-CH_3$

4. $CH_3-CH(CH_2-CH_3)-CH_2-CH_3$

5. $CH_3-CH_2-CH(CH_3)-CH_2-CH_2-CH_3$

6. $CH_3-CH_2-CH(CH_3)-CH_2-CH_2-CH_2-CH_3$

7. $CH_3-CH_2-CH_2-CH_2-CH(CH_2-CH_3)-CH_2-CH_2-CH_2-CH_2-CH_3$

8. $CH_3-CH_2-CH(CH_2-CH_3)-CH_2-CH_2-CH_2-CH_2-CH_3$

9. $CH_3-CH_2-CH_2-CH(CH_3)-CH_2-CH_2-CH_2-CH_3$

10. $CH_3-CH_2-CH(CH_3)-CH_2-CH_2-CH_2-CH_2-CH_3$

Write condensed structural formulas for the following:

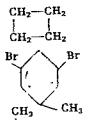
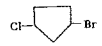
11. 4-methyloctane
12. 4-ethyldecane
13. 3-ethylpentane
14. 3-ethylhexane
15. 5-butyldecane
16. 4-ethylheptane
17. 3-methylnonane
18. 2-methylheptane
19. 4-propylheptane
20. 5-butylnonane

C. Cycloalkanes–C_nH_{2n} and Aromatic Hydrocarbons

Nomenclature Rules Summary:

1. For cycloalkanes, add the prefix "cyclo-" to the name of the alkane forming the ring.
2. Aromatic hydrocarbons are normally named as derivatives of benzene.
3. Number the carbon ring so that the substituents have the lowest set of numbers.

Name the following structures.

1. _____ 
2. _____
3. _____ 
4. _____ 

Group III. Draw structural formulas

1. n-butane
2. 2-chloropentane
3. 3-methylhexane
4. n-heptane
5. 1, 2, 4-trichloropentane
6. 2, 3, 4-trimethylhexane
7. 2, 3, 3-trimethylheptane
8. 4-bromo-4-chloro-2-methyldecane
9. 2, 3-dimethyl-3-hexene
10. 2-chloro-1-pentene
11. 2, 2, 3, 5-tetramethyl-3-octene
12. 1, 4, 5-tribromo-2, 2-dichloro-3-heptene
13. 3-chloro-2, 3-difluoro-1-butene
14. 1, 3-butadiene
15. ethanol
16. 2-propanol
17. 2-pentanol
18. 3, 3-dimethyl-2-hexanol
19. 1, 2, 3-trichloro-1-butanol
20. 3-ethyl-2, 2-dimethyl-1-hexanol