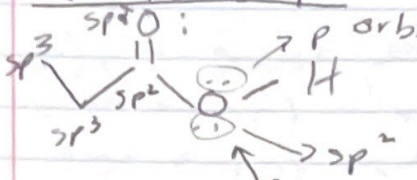
Lecture 7



Since O can participate in resonance, hybridization ≠ sp^3.

↑ adjacent π orbitals

Resonance Review

Cycloalkanes, Alkanes, & Cyclic Molecules:

- Cycloalkanes & Alkanes are hydrocarbons.
- -ane ending
- Characterized by C-C single bonds (σ)

1. Alkanes
   C_nH_{2n+2}

   Ex: C_3H_8 (propane)

2. Cycloalkanes (cyclo-)
   C_nH_{2n}

   Ex: C_6H_{12} (cyclo**hex**ane)
   root

Can be branched
Ex: Isobutane

Alkanes
- Methane: CH_4
- Ethane: C_2H_6
- Propane: C_3H_8
- Butane: C_4H_{10} (normal) n-butane
- Pentane: C_5H_{12} n-pentane

Constitutional Isomer:
Same molecular formula, but different connectivity.

Nomenclature of Alkanes:

Prefix	#C
Meth	1
...	
Dec	10
Undec	
Dodec	
Tridec	
Tetradec	
...	
Eicos	20

Alkyl Group: "Group derived by removing an alkane, given the symbol R–" => Suffix -yl

Rules for IUPAC naming:

1) Name for an unbranched carbon chain
2) Longest chain is parent chain. Becomes root name.
3) Give each substituent of p.c. a name & number.

Ex: 2-methyl propane
(no hyphen)

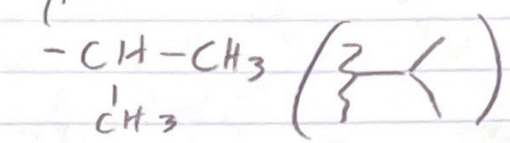
4) If one substituent, number parent chain from end that gives substituent lower number.
5) If 2+ identical, number P.C from end that gives lower # of the first encountered substituent. # of times indicated by prefix. Comma to separate position numbers.

6) If 2+ substituents, list in alphabetical order (from root name). Same numbering as #5 (from first encountered). If multiple substituents on same positions, on opposite ends, give lower alpha the lower number

7) Prefix not included in alphabetizing

8) When 2+ p.c. of = length, choose the one with the greatest # substituents.

Practice

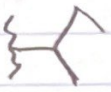


Alkyl Groups:

1-methylethyl (isopropyl, iPr)

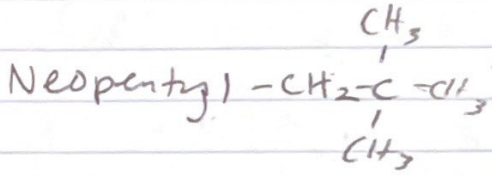
2-methylpropyl (isobutyl, iBu)

2-methylpropyl (sec-butyl, s-Bu)



tert-butyl

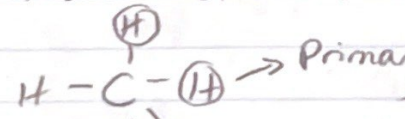
Neopentyl



Constitutional Isomer = Structural Isomer

Classif. of C & H in alkanes:

primary $-CH_3$

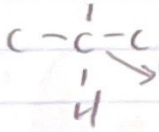


Primary (1°) Hydrogen

Primary (1°) Carbon

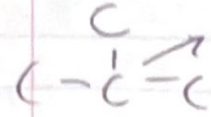
secondary $-CH_2$

Secondary (2°) Hydrogen



Secondary Carbon

Tertiary C-H



H → Tertiary (3°) Hydrogen

Magnetic & Electrogyric difference between 2 identical groups (but different hydrocarbon arrangement) like 1°, 2°, 3° ~~different sub~~ are different.