

ORGANIC CHEMISTRY CH 384, Fall 2011
WORKSHOP 1
Bonding and Structure

1. Different structural isomers of C_5H_{12} were treated under conditions which replaces a single H atom with Cl, forming different isomers of $C_5H_{11}Cl$. (We'll discuss this reaction in Chapter 4, but you really don't need to know any more than what's just been stated).

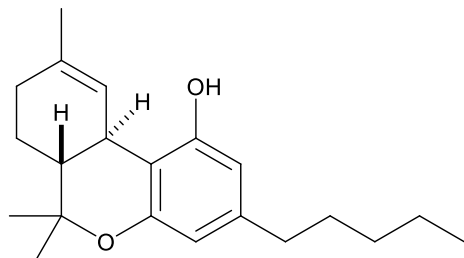
Identify the structural isomers in each case below.

- a. A C_5H_{12} compound that gives three different $C_5H_{11}Cl$ isomers.
 - b. A C_5H_{12} compound that gives four different $C_5H_{11}Cl$ isomers.
 - c. A C_5H_{12} compound that gives only one $C_5H_{11}Cl$ isomer.
 - d. Are there any other C_5H_{12} isomers? Convince your neighbors.
2. An experimental technique called ^{13}C Nuclear Magnetic Resonance (NMR) Spectroscopy allows chemists to tell how many different kinds of carbons there are in a molecule and whether carbons are primary (1°), secondary (2°), tertiary (3°), or quaternary (4°).

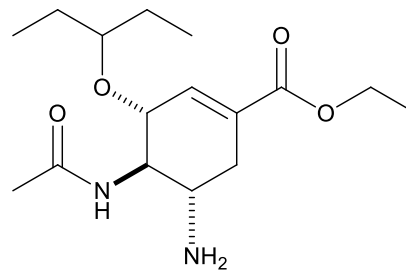
Give the Kekule structure (*i.e.*, use for electron pair bonds) for the following compounds having molecular formula C_6H_{12} . On each structure, identify carbons as 1° , 2° , 3° , or 4° , tell how many different kinds of carbons there are, and designate which carbons are equivalent.

- a. A compound having only single bonds and only secondary carbons.
 - b. A compound having only single bonds and primary, secondary, and tertiary carbons.
 - c. A compound having only single bonds and only primary, secondary, and quaternary carbons.
 - d. A compound having only single bonds and primary, secondary, tertiary, and quaternary carbons.
3. Draw Kekule structures (show all bonds as lines and show all non-bonding electron pairs) for constitutional isomers with molecular formula $C_3H_6O_2$. Circle each functional group and indicate its appropriate family name.
4. Can you come up with the structure of a C_8H_{18} isomer that could only give one isomer of $C_8H_{17}Cl$?

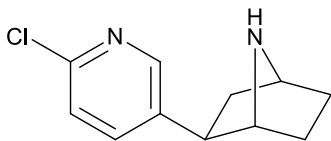
5. For the following compounds:
- What is the molecular formula?
 - Indicate where the molecule has a “strong” permanent dipole.
 - List some of the functional groups found in the following compounds



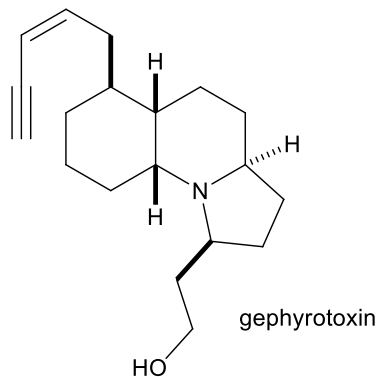
Δ^9 -tetrahydrocannabinol the main psychoactive chemical in marijuana



Osetamivir (Tamiflu)



epibatidine



gephyrotoxin

epibatidine and gephyrotoxin are poisons from poison dart frogs