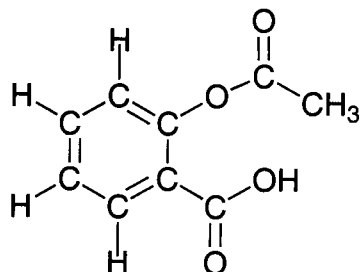


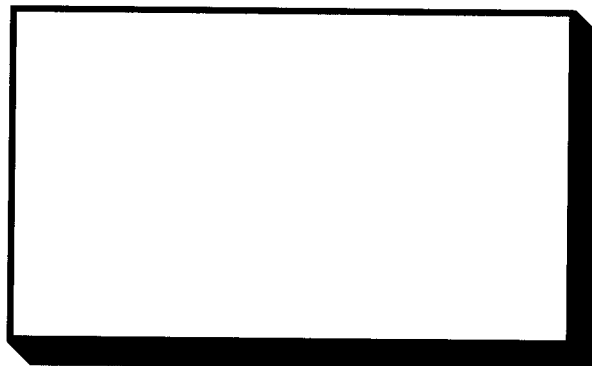
Drawing Organic Molecules

1. Redraw the following compounds in line-angle format, and include all lone pairs.

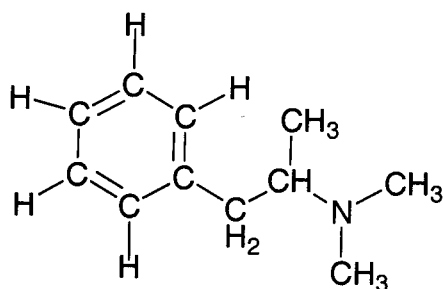
(a)



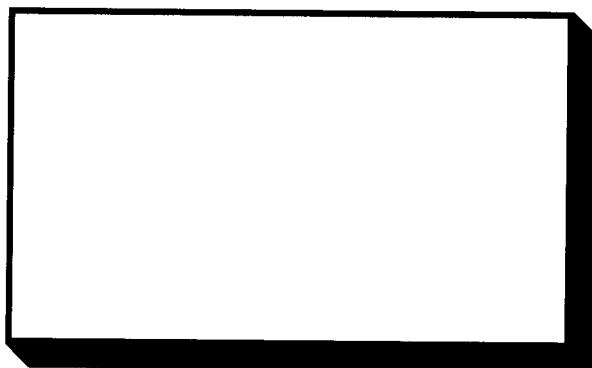
Acetylsalicylic Acid
(Aspirin)



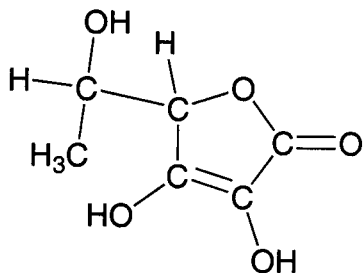
(b)



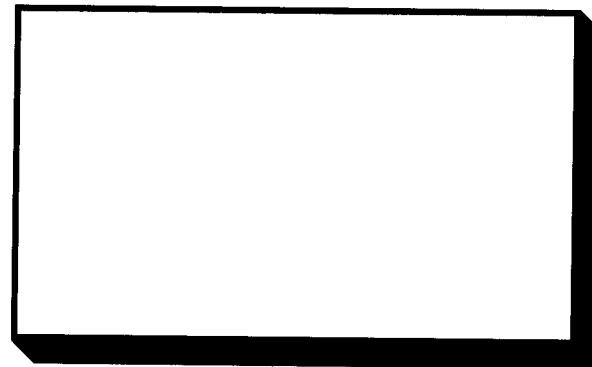
Methamphetamine



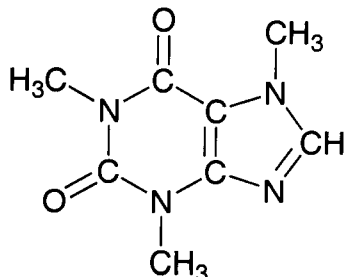
(c)



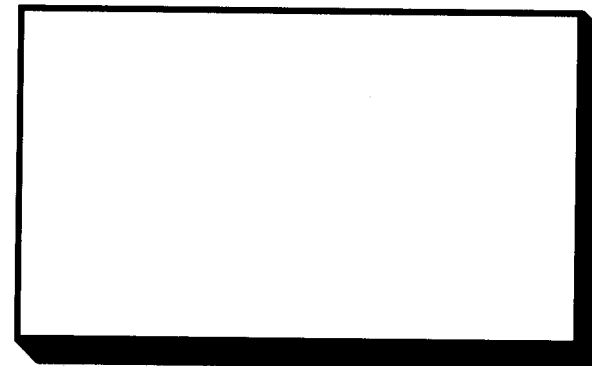
Ascorbic Acid
(Vitamin C)



(d)



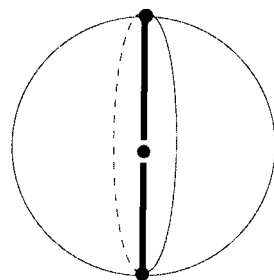
Caffeine



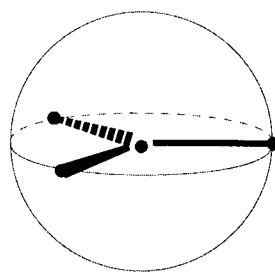
VSEPR Theory

# of Electron Density Regions	Bond Angles	Geometry
2	180°	linear
3	120°	trigonal planar
4	109.5°	tetrahedral

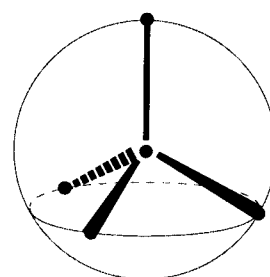
A simple geometrical construction- place the nucleus of the atom at the center of a sphere, then place points of electron density (i.e., atoms or lone pairs) on the surface of the sphere such that they are as far apart as possible. The resulting arrangement is the geometry at that atom



Linear



Trigonal



Tetrahedral

2. Use the VSEPR model to predict the geometry of the following molecules at the atom highlighted in bold.

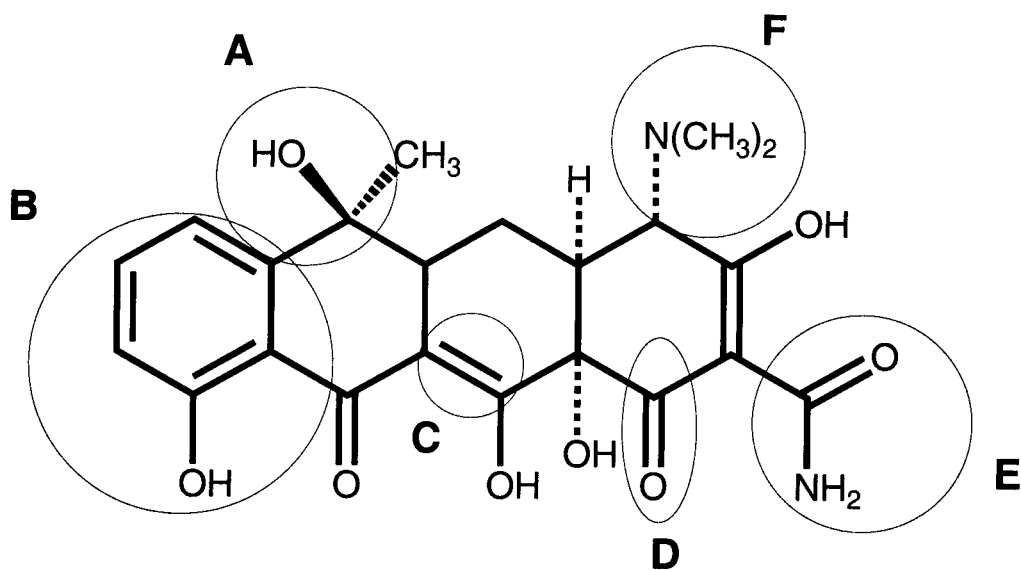
(a) C_2H_2 , acetylene

(b) Propene, $\text{MeCH}=\text{CH}_2$ (for the central carbon)

(c) Ethanol, $\text{CH}_3\text{CH}_2\text{OH}$

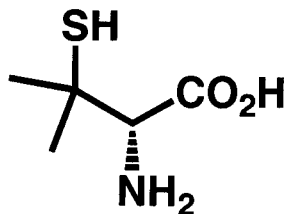
Functional Groups

3. Identify the circled functional groups in Tetracycline



- A _____
- B _____
- C _____
- D _____
- E _____
- F _____

4. A Combined Problem (Blatantly Stolen from a Dr. H Exam)



(a) Fill in the blanks:

Total # of lone pairs _____

Total # of hydrogen atoms _____

Total # of tetrahedral atoms _____

of carbonyl groups _____





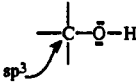
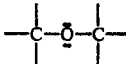


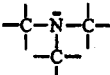
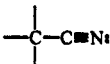
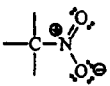
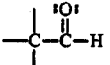
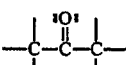
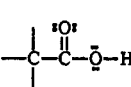
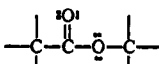
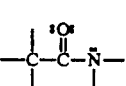
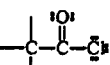
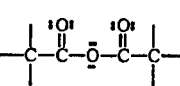
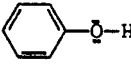
Name the functional groups _____

Most polar bond _____

Approximate NCC bond angles _____

(b) By adding, subtracting, or changing at most 5 atoms in the molecule, rewrite the structure so that it contains an ester functional group.

**Functional Groups Every Organic Student Should
KNOW**

"Family Name"	Functional Group Structure	Name ending (IUPAC)
Alkane	contains only C-H, C-C single bonds	-ane
Alkene		-ene
Alkyne		-yne
Arene	 (alternating C-C & C=C in cyclic cpd)	—
Halide	 X = F, Cl, Br, I	—
Alcohol		-ol
Ether		ether
Amine	 or  or 	-amine
Nitrile		-nitrile
Nitro		—
Aldehyde		-al
Ketone		-one
Carboxylic acid		-oic acid
Ester		-oate
Amide		-amide
Acyl chloride		-oyl chloride
(Acid) Anhydride		-oic anhydride
Phenol	 (-OH connected to aromatic ring)	-phenol