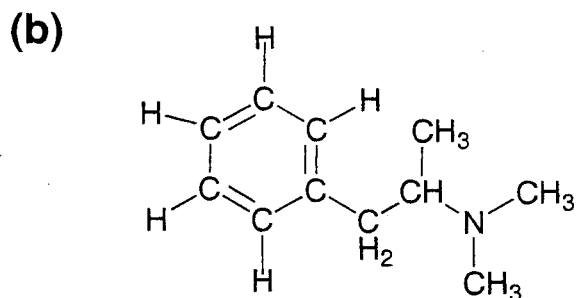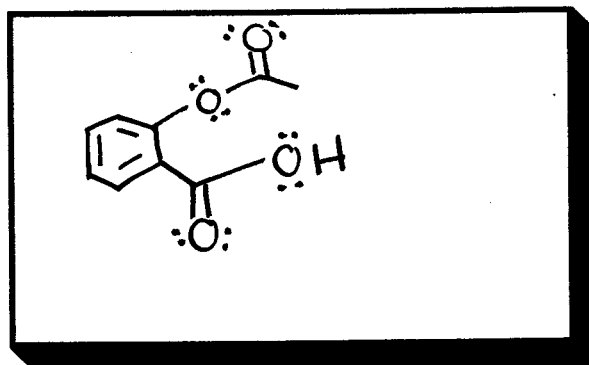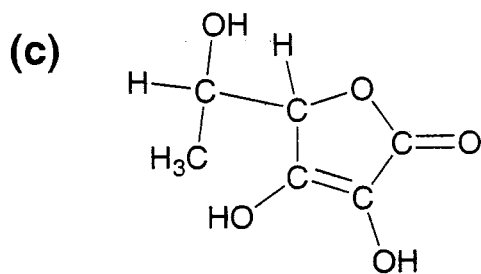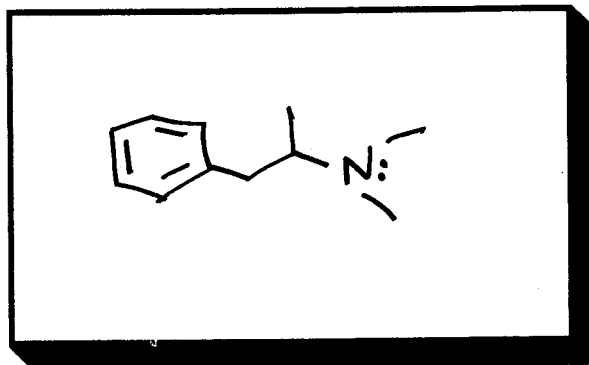# 1. Redraw the following compounds in line-angle format.

(a)
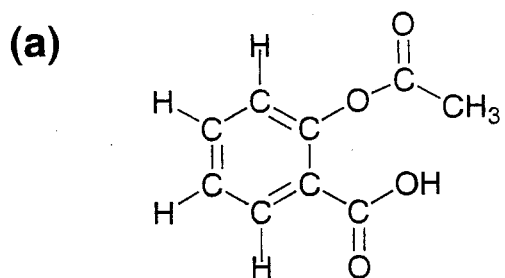
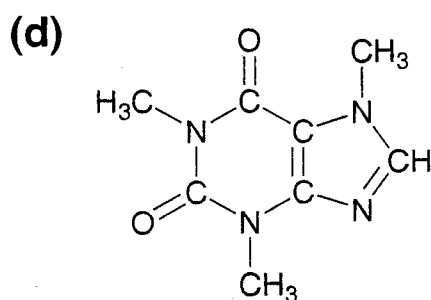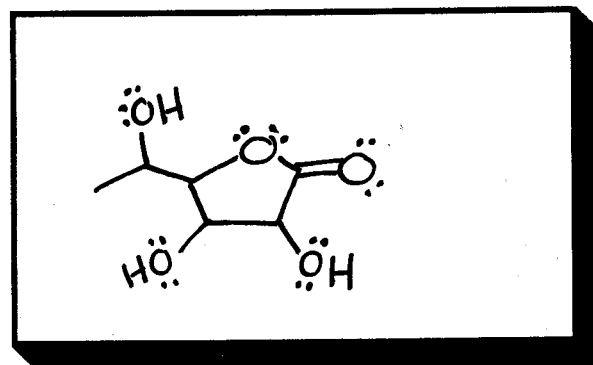Acetylsalicylic Acid
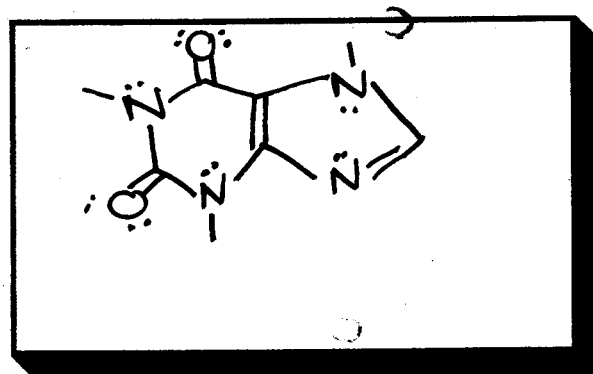(Aspirin)

(b)

Methamphetamine

(c)

Ascorbic Acid
(Vitamin C)

(d)

Caffeine

VSEPR Theory

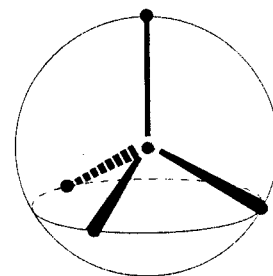| # of Electron Density Regions	Bond Angles	Geometry
2	180°	linear
3	120°	trigonal planar
4	109.5°	tetrahedral

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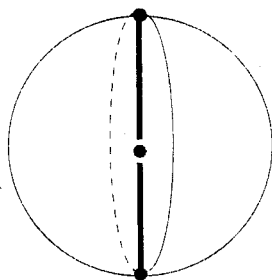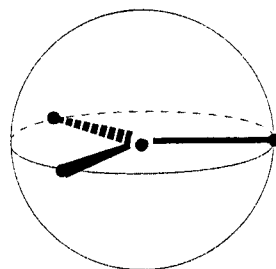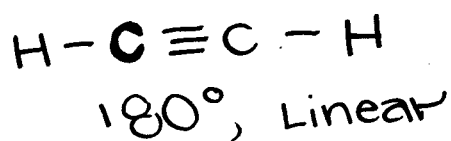

Linear   Trigonal   Tetrahedral

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

(a) C_2H_2, acetylene

$$H-\textbf{C} \equiv C - H$$
180°, Linear

(b) Propene, $MeCH=CH_2$ (for the central carbon)

~120°, Trigonal
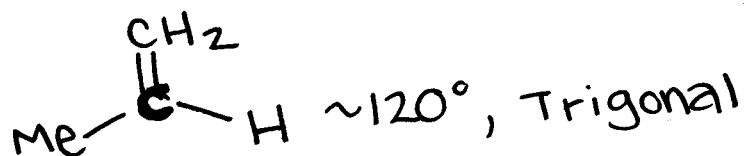
(c) Ethanol, CH_3CH_2OH

~109.5°, Tetrahedral
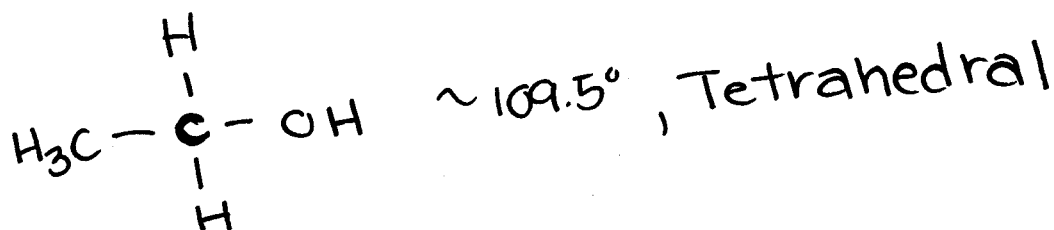
Functional Groups

3. Identify the circled functional groups in Tetracycline
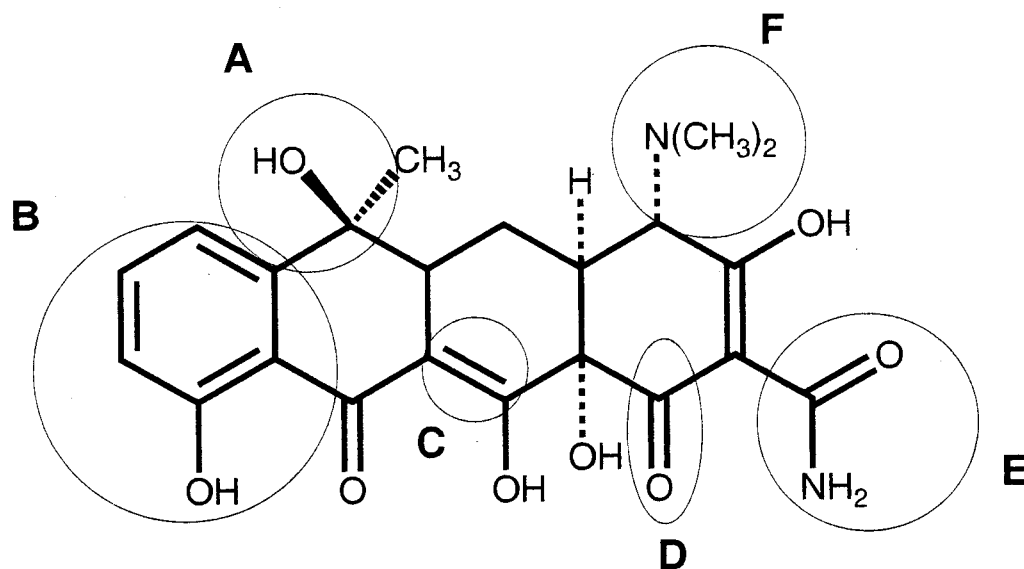
A Alcohol

B Phenol

C alkene

D Ketone

E amide

F amine

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

$$\begin{array}{c} SH \\ | \\ \diagdown\!\!\!\diagup\!\!\!\diagup\!\!\text{---}CO_2H \\ | \\ NH_2 \end{array}$$
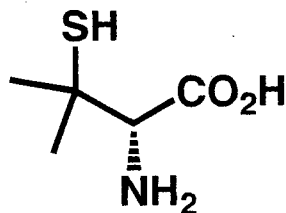
(a) Fill in the blanks:

Total # of lone pairs ___7___

Total # of hydrogen atoms ___11___

Total # of tetrahedral atoms ___7___

# of carbonyl groups ___1___

Name the functional groups ___Thiol, amine, carboxylic acid___

Most polar bond ___O-H___

Approximate NCC bond angles ___~109.5°___

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

$$\begin{array}{c} O \\ \| \\ HS\diagdown\!\!\!\diagup\!\!\text{---}C\text{---}OCH_3 \\ | \\ NH_2 \end{array}$$