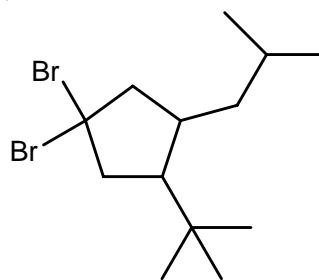
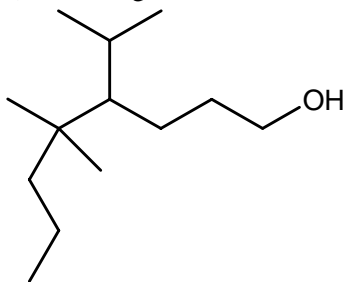


1) Please give the correct IUPAC names for the following compounds.



2) Define:

a. Carbanion:

b. Functional Group:

c. Lewis Acid:

d. Lewis Base

3) **a)** Draw the Lewis Dot Structure for each compound. **b)** Draw **ONE** resonance contributor for each compound. (use arrows to show electron flow). **c)** Does the molecule have a net dipole? If so, indicate the direction in a).

Compound

Lewis Dot Structure

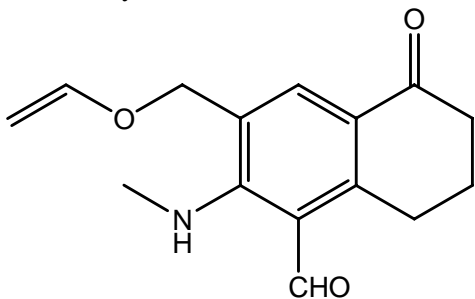
Resonance Structure

Net Dipole?

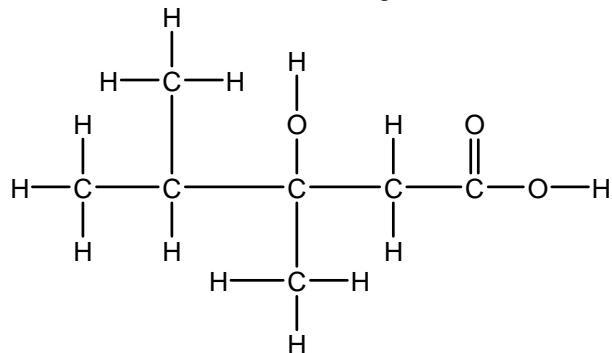
a) CH_3CN

b) N_3^-

4. Clearly circle and label all the functional groups in the molecules shown below.



5. Draw the molecule below according to the structural formula indicated:



Condensed Formula

Bond Line Formula

3-D Formula

(just around the C2-C3 bond counting from the left above)

6. a) State the number of sigma (σ), pi (π) and nonbonding (nb) electron pairs in molecule in hydrogen cyanide(HCN).
 b) Draw the molecular orbital diagram for the molecule. (Label the bonding, nonbonding and antibonding orbitals).

Compound


σ -bonds





π -bonds

nb e' pairs

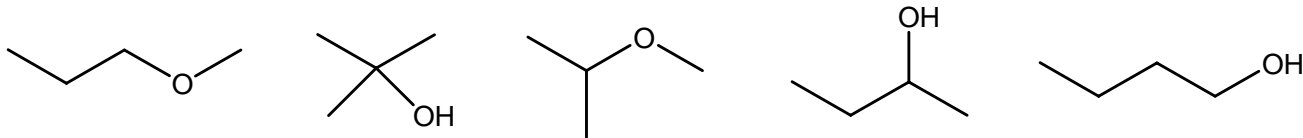
Molecular Orbital Diagram

7. a) What is VSEPR theory?

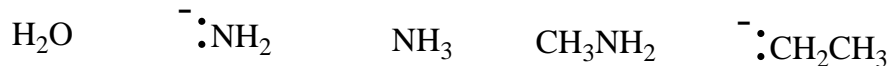
- b) Using VSEPR theory, state the hybridization, shape, and bond angles of the atoms indicated ().

	<u>Hybridization</u>	<u>Shape</u>	<u>Bond Angle</u>	<u>Functional Group</u>
CH ₃ COCH ₃ 	_____	_____	_____	_____
H ₂ SO ₄ 	_____	_____	_____	_____
⁺ CH ₃ 	_____	_____	_____	_____
CH ₃ OCH ₃ 	_____	_____	_____	_____

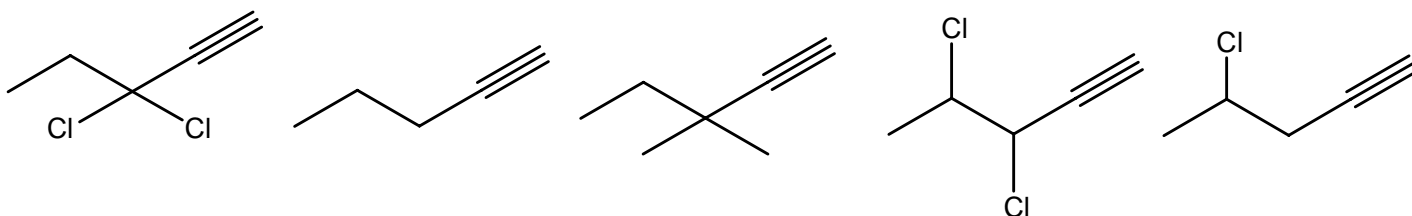
8. Rank the following compounds according to their boiling points (1= Highest BP and 5 =Lowest BP).



9. Rank the following compounds according to their basicity (1= most basic and 5 = least basic).



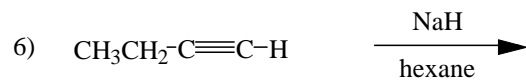
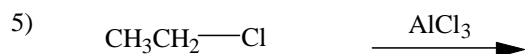
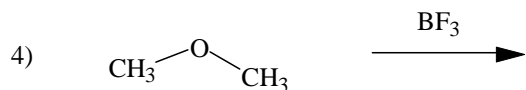
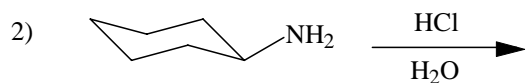
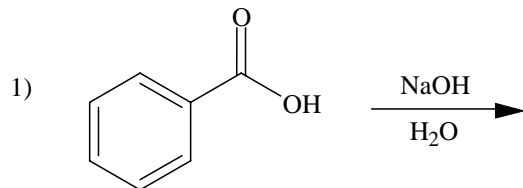
10. Rank the following compounds according to their acidity (1= most acidic and 5 = least acidic).



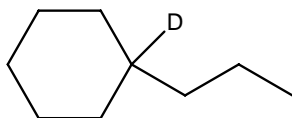
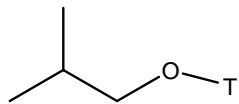
10. a) Predict the product of the following reactions.

b) Designate the nucleophile (Nu); electrophile(E+); Bronsted-Lowry acid/base/conjugate acid/conjugate base; and the Lewis acid/base, where appropriate.

c) Using curved arrows, show the mechanism of the reaction.



11. Starting with the appropriate unlabeled organic compounds, show how to synthesize the following compounds.



12. a) Below are spectra for iso-propylamine ($\text{CH}_3)_2\text{CHNH}_2$ and iso-butylamide ($\text{CH}_3)_2\text{CHCONH}_2$. Please label each spectrum with the appropriate name and carefully explain why you chose that compound with that spectrum.

