1. Draw the Lewis Structure AND label the hybridization of ALL non-hydrogen atoms in…
   1. CH2CHCCH
   2. HCO3—
2. Draw the structure of a compound that contains only carbon and hydrogen atoms and that has one sp3 hybridized carbon and two sp2 hybridized carbons.
3. Draw the structure of a more acidic molecule with the same molecular formula as CH2ClCH2OH. Briefly explain.
4. What is the conjugate acid of NH2—? Of CH3OH?
5. Explain whether HCO2H is a strong or weak acid based on the strength of its conjugate base. (Your answer must be in terms of its conjugate base and may not include anything about the structure of the acid given.)
6. Magnesium is commonly used in organic chemistry.
   1. What is the full electronic configuration of Mg2+.
   2. Briefly (but specifically) explain whether the Magnesium in MgCH3 is acidic or basic.
7. Explain briefly (but specifically) which is the stronger base: CH3O— or CH3NH—. (You must explain using the structures provided.)
8. Show the MECHANISM (arrows to show e- flow) for the reaction between dimethyl ether and hydrochloric acid. You must show full Lewis Structures and formal charges.
9. Show the MECHANISM (arrows to show e- flow) for the reaction between ethanol and NH2—. You must show full Lewis Structures and formal charges.
10. Show the MECHANISM (arrows to show e- flow) for the reaction equilibrium between ethyne, CHCH, and OH—. You must show full Lewis Structures and formal charges.
    1. Ethyne, CHCH, has a pKa of 25. Water has a pKa of 15.7. Ammonia, NH3, has a pKa of 36. Explain briefly whether the reaction above favors the reactants or the products.
11. Draw one of the two chair conformers of cis-1-ethyl-2-methylcyclohexane. Perform a ring flip. Label the most stable conformer & briefly explain why.
12. Draw the most stable Newman Projection of the 1-2 bond axis of sec-butylbromide. (please use two different colors)
13. Calculate the degrees of unsaturation in C7H6O2. Then draw the one most probable structure. There is only one structure most likely that we discussed!
14. Explain briefly (but specifically using intermolecular forces) which molecule in each pair below has a higher boiling point. (make sure to label each substances’ intermolecular forces)
    1. 1-hexanol or 1-methoxypentane
    2. carboxylic acid or alcohol
15. Draw the functional group of the following:
    1. ketone b. ester c. amide d. aldehyde
16. Nomenclature:

See lecture guide examples: all IUPAC and Common nomenclature required!

BONUS:

Give the common name of….

Draw the structure of methylene cyclopentane.

Show the ground state, excited state, and hybridized state of carbon in ethene.

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    1. Ethyne, CHCH, has a pKa of 25. Water has a pKa of 15.7. Ammonia, NH3, has a pKa of 36. Explain briefly whether the reaction above favors the reactants or the products.

BONUS:

Give the common name of….

Draw the structure of allyl cyclopentane.

Show the ground state, excited state, and hybridized state of central carbon in CH2CCH2.