

Chemistry 2301
Professor Steven Kass
Test 1
September 29, 2004

(Please Print Your Name)

Points

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

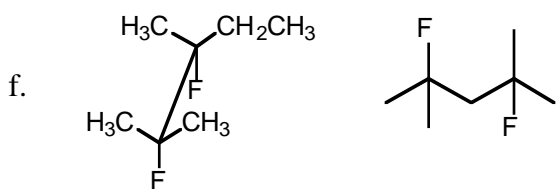
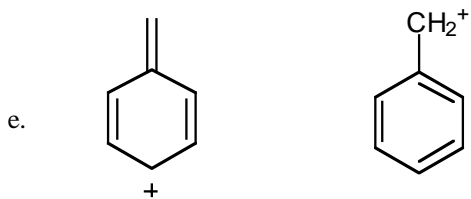
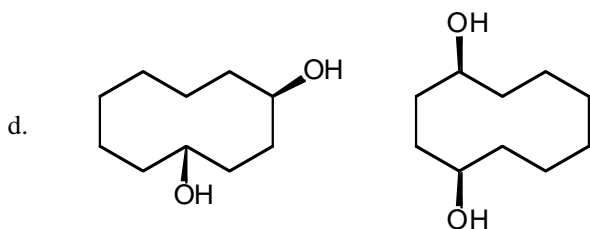
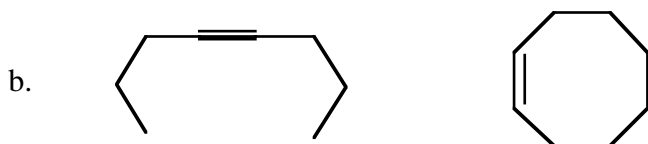
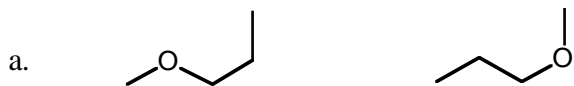
Total: _____

You have one hour to answer all of the following questions. Note the point values (110 total), be sure to budget your time, and **write all your answers below in ink**. Good luck!

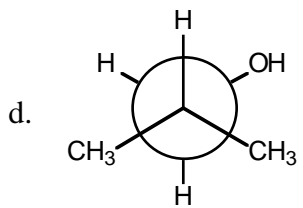
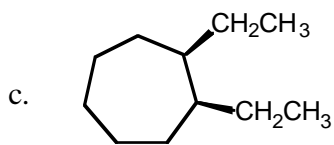
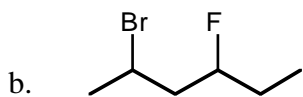
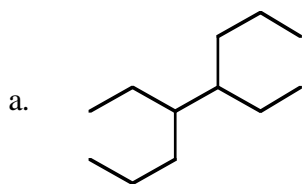
1 (20 Points). Write complete Lewis structures for the compounds below. Be sure to show all of the major contributing resonance structures and formal charges, if any.



2 (24 Points). Provide the relationship which best describes the following pairs of compounds from the following choices: Same compound, different compounds, resonance structures, structural isomers, or geometric (cis/trans) isomers.

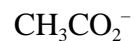
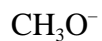
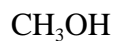
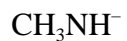
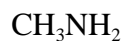


3 (20 Points). Give the systematic (IUPAC) names for the structures given below.

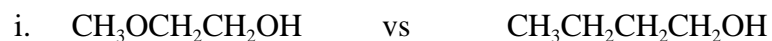


4 (16 Points). Use your knowledge about acids and bases to answer the following questions.

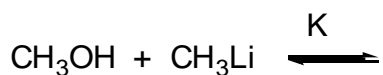
a. Rank the following compounds in order of decreasing basicity (1 – 5 where 1 is the strongest base and 5 is the weakest base).



b. Indicate the stronger acid in the following pairs of compound.

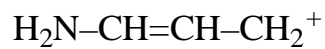


c. Complete the reaction below, indicate if K is < 1 or > 1 , and label the strong acid, strong base, weak acid, and weak base.

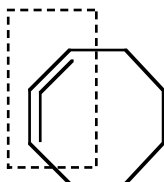


5 (20 Points).

a. Indicate the hybridization at the nitrogen atom and all three carbons of the molecule below. Also, provide a 3-dimensional drawing of the structure of this compound (i.e. show its geometry).



b. Consider the species below and indicate the hybridization of the carbon atoms enclosed in the box and explain why this molecule is strained in a single sentence.



6 (10 Points). Consider 2,2-dimethylpentane and draw a Newman projection for the most and least stable conformers looking down the C2–C3 bond (Be sure to indicate which structure is most stable and which is least stable).