

Sample Exam 1, Organic Chemistry, Hanson

- (15) 1. In each case, provide an example of an organic compound containing at least two oxygen atoms and having at least one carbon atom with specified type of hybridization. In each case draw a valid Kekulé structure.

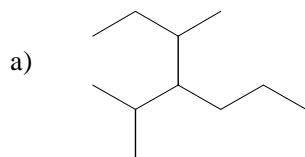
a) sp^3 b) sp^2 c) sp

- (20) 2. In each case, circle the compound you believe would be the stronger acid and draw a Lewis or Kekulé structure of its conjugate base.

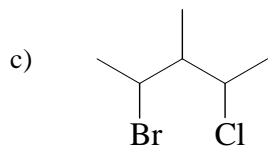


- (15) 3. Explain how you would separate a mixture of benzoic acid ($pK_a = 4$), vanillin ($pK_a = 10$), and triethylamine (pK_a of its conjugate acid = 10). You may use water, ethyl ether, 1.0 M aqueous HCl solution, pH 7 buffer, and 1.0 M aqueous NaOH solution. Please use a flow chart.

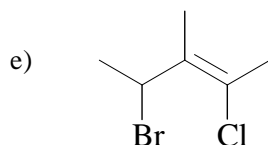
- (20) 4. Name the following compounds, or, in the case where names are given, provide a structure:



b) *sec*-butyl ethyl ether

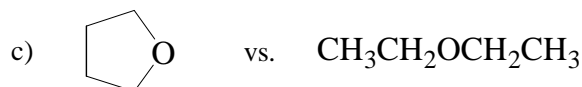
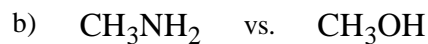
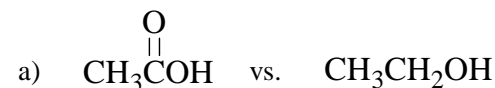


d) *N*-isopropyl-3,4-dimethyl-2-hexanamine



f) (*Z*)-5-(1-bromopropyl)-3-pentyl-2-nonen-1-ol

- (15) 5. In each case, circle the compound with the higher boiling point. Briefly explain your reasoning.



- (15) 6. Draw the two chair conformers of *all cis*-1,2,4-trimethylcyclohexane, clearly indicating all bonds to hydrogen atoms attached to the ring. On each drawing, circle all axial hydrogen atoms and indicate all gauche butane interactions. Predict which conformer will be more stable.