

Exam # 1
Chemistry 2401 – February 9, 2007

(18) I. Draw structural formulas for the following (show nonbonded electron pairs).

A. An alkene with a formula of C_5H_{10}

B. An alcohol with a formula of $C_4H_{10}O$

C. An ether with a formula of $C_5H_{10}O$

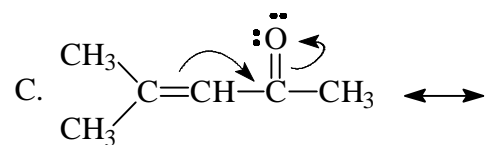
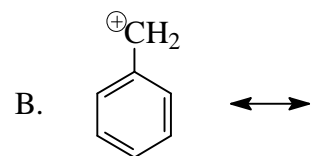
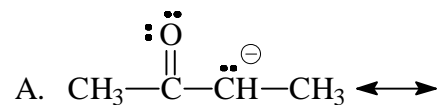
D. A secondary amine with a formula of $C_4H_{11}N$

E. An ester with a formula of $C_6H_{12}O$

F. An amide with a formula of $C_5H_{11}NO$

(10) II. Draw Lewis structural formulas for five isomers of molecular formula, C_3H_6O .

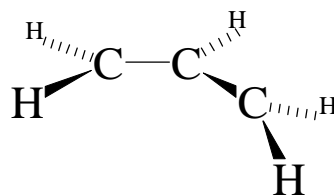
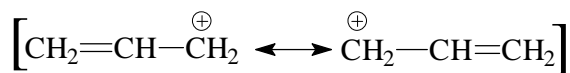
(9) III. Draw one other resonance structure for each of the following. Don't forget formal charges and nonbonded electron pairs.



(12) IV. Show how p orbitals interact to produce the pi bonds in each of the following. I have provided a framework for you to start with.

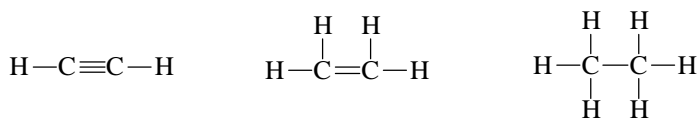


C. The real ion represented by the resonance structures below

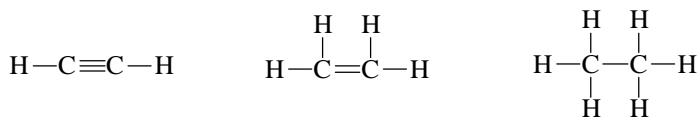


(15) V. In each of the following you should circle the example that has the largest value for the characteristic indicated and underline the example that has the smallest value for that characteristic.

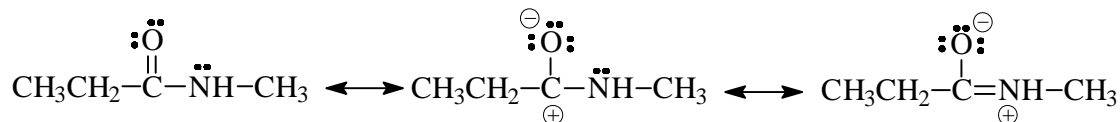
A. Bond dissociation energy for the C – H bond.



B. Strength as an acid

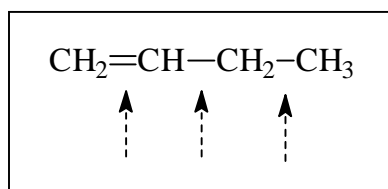


C. Most important resonance structure



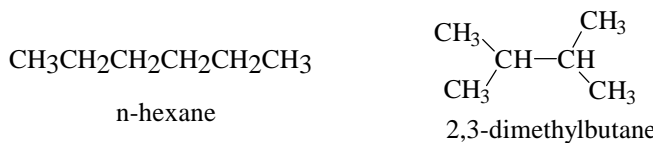
D. Value of pK_a : HCl HBr HI

E. Bond length:

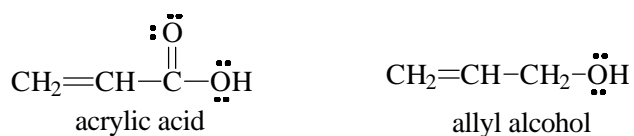


(15) VI. Explain each of the following in terms of the structures of the molecules involved. Pictures may be appropriate as well as words.

A. Why the boiling point of n-hexane is higher than for 2,3-dimethylbutane.



B. Why acrylic acid is a stronger acid than allyl alcohol.



C. Why 2-butanone has a higher boiling point than 2-methylbutane.



D. Why propyl amine has a higher boiling point than its isomer, trimethyl amine.



E. How a detergent facilitates the removal of grease from a frying pan in a dish washer.