

Resonance and Orbitals
Week 2 Problem Set
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Patterns:

- a. Lone pair next to the π bond (double or triple)
- b. Lone pair next to the charge
- c. π Bond next to the charge
- d. π Bond between two atoms where one is very EN
- e. Alternating π bond in a ring

Relative Importance of Contributing Structures:

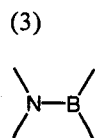
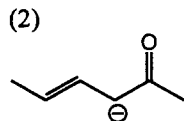
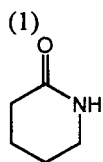
- (1) Maximize octets
- (2) Minimize charge
- (3) Negative charge on more EN element

A. Define *resonance*.

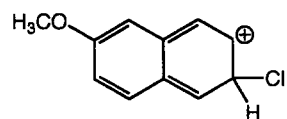
B. Define *resonance hybrid*.

C. Why is it incorrect to use ' \rightleftharpoons ' when describing resonance structures.

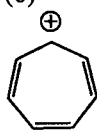
D. Draw *all* possible reasonable resonance contributors and resonance hybrids. Indicate which contributor is most important. If there are no other contributors *explain why*.



(5)



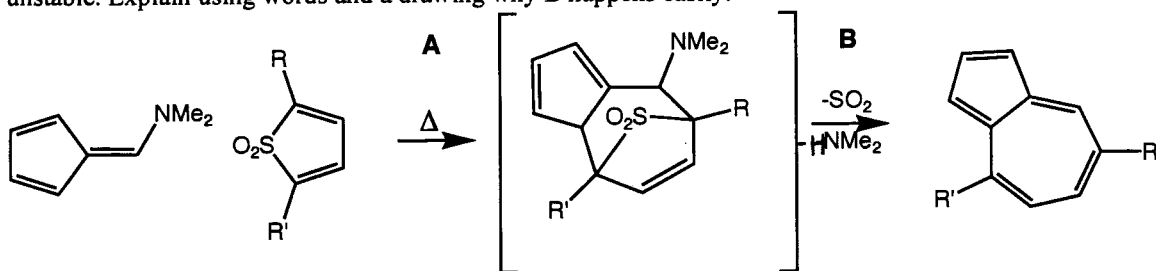
(6)



(10)



(11) Step A is a [6+4] cycloaddition followed by B, a loss of SO_2 and NMe_2 . The molecule in brackets is unstable. Explain using words and a drawing why B happens easily.



D. Describe the *hybridization* and the *geometry* of the atom(s) (arrows) in the following molecules.

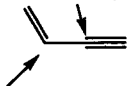
1.

furan



2.

1-buten-3-yne



3.

acetophenone

