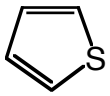
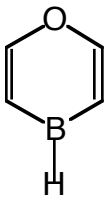


1. Determine the number of π electrons for each compound below, then indicate whether they are aromatic, antiaromatic, or neither. Assume the molecules are neutral and planar unless otherwise indicated.



Number of π electrons: 6

Aromatic, Antiaromatic, or Neither?



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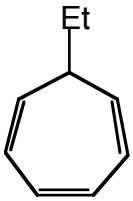
Aromatic, Antiaromatic, or Neither?



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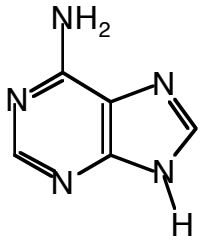
Aromatic, Antiaromatic, or Neither?

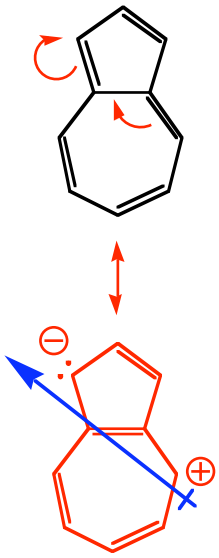


Number of π electrons: 10

Aromatic, Antiaromatic, or Neither?

2. Listed below are some unexpected observations with regard to concepts we've covered thus far this semester. Use your knowledge of OChem to explain these phenomena. Be explicit in your explanations. In other words, don't just "say" resonance, draw it! Don't just "say" something is more stable, illustrate why!

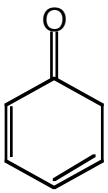
a)



This molecule is polar!

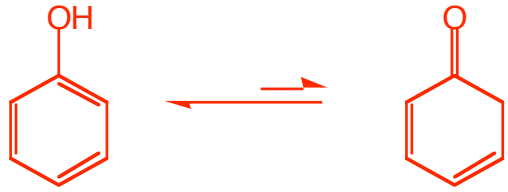
Normally, hydrocarbons are not polar molecules! However, the two rings in this compound have the opportunity to each become aromatic. If we draw a resonance structure that places 6 π electrons on each ring, then both rings will be aromatic (rather than the entire structure being aromatic as a whole). Having two aromatic rings in a molecule instead of one makes it especially stable. Thus, this structure would be a significant resonance contributor, which means it would possess a dipole and be somewhat polar.

b)



The tautomerization reaction that forms this molecule actually favors the enol form!

Usually, the enol form is less stable in tautomerization reactions. However, notice that the enol in this reaction contains a benzene ring. The aromaticity of the ring helps to stabilize the enol, making it the more favored species in this equilibrium.

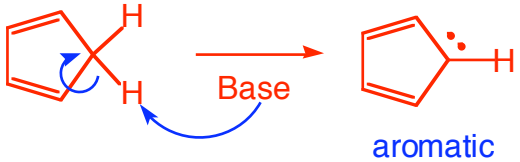


enol form

c)

This molecule is more acidic than an alkyne!

Usually, alkenes and alkanes are less acidic than alkynes. However, if the molecule shown donates a proton (i.e. acts as an acid), it forms a fairly stable conjugate base. This is because the conjugate base is an aromatic compound.



aromatic

planar
cyclic
conjugated
4n+2 π electrons