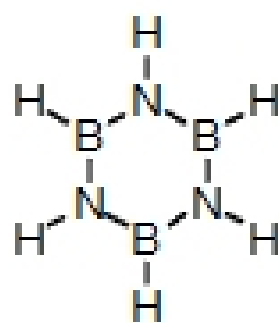


(covering material thru section 14.13)

1. (a) Consider the electronic structure of the carbocation that would result from the loss of a hydride ion from the  $sp^3$  hybridized carbon of 1,3-cyclopentadiene. How many electrons are in the  $\pi$  system of this cation? Are they all paired?

(b) Now consider the loss of a proton from the  $sp^3$  hybridized carbon of 1,3-cyclopentadiene. Write the resonance structures of this cyclopentadienyl anion to show how the negative charge can be delocalized over the five carbon atoms.

2. Borazole, shown below, is an aromatic compound. Explain why.



3. Are the following compounds aromatic according to the Hückel rule?



4. On the following two pages are the  $^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of the product of the following reaction. Draw the structure of the product.

