

# CH328N Homework 5

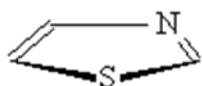
**Due:** in the box by 5PM on Monday, February 22

**Read:** 890-906

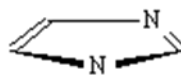
**Do:** 21.3, 21.4, 21.5a,d; 21.8a,b,i; 21.9a, d, l,m; 21.15 c,d,e,g,h,i,j; 21.17, 21.20

## Supplemental Problems:

1. The structures of the aromatic heterocycles thiazole and imidazole are shown below. Please draw p orbitals on each of the  $sp^2$  hybridized carbons and draw the appropriate orbitals on the hetero atoms. Clearly indicating which electrons from each element are incorporated into the pi system of the rings.

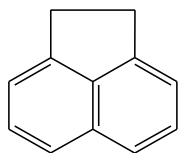


Thiazole

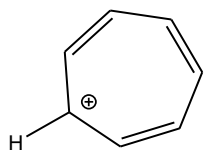


Imidazole

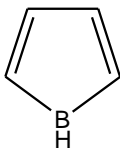
2. (10 Pts) State the number of p-orbital electrons in each of the following structures and circle those you predict to be aromatic:



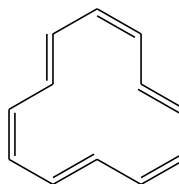
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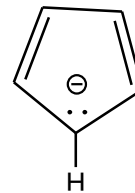
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