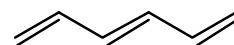


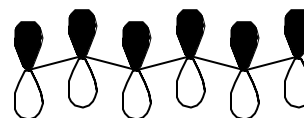
## Chemistry 2302

### In-Class Exercise Solutions Molecular Orbital Diagrams of Conjugated Systems

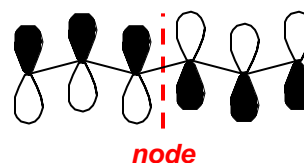
1. 1,3,5-hexatriene has 6 atomic  $p$  orbitals in a row. So, our molecular orbital diagram will have **6** orbitals.



2. Our most stable orbital will have all six  $p$  orbitals in phase:



3. Our next most stable orbital will have a node in the middle:



4. See diagram on the next page.
5. Again, see next page.
6. Hexatriene has all of its  $\pi$  electrons in its three double bonds, which contain a total of 6  $\pi$  electrons (two for each bond). So there are six total electrons to fill the molecular orbitals we've built. They go, in spin pairs, in the three lowest-energy orbitals.

Molecular Orbital Diagram:

