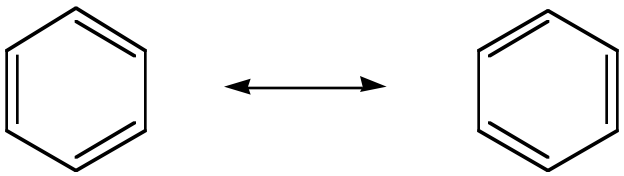
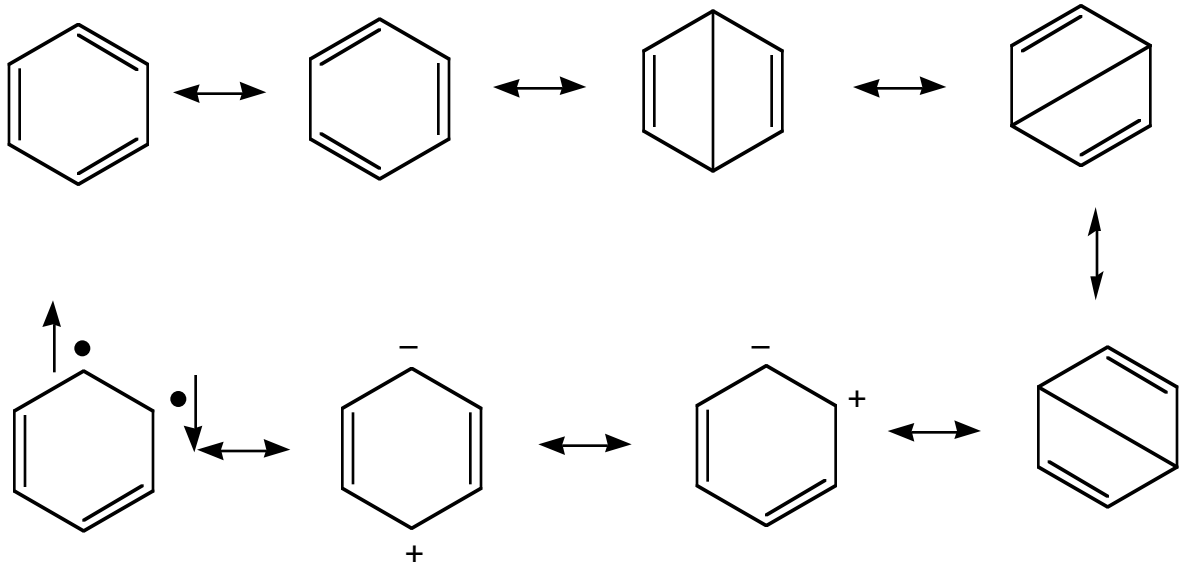
Answers to Problem 10, Chemistry 301X - 2006

(a) Draw a resonance form for the following molecule (benzene). First, think hard about the geometry of this molecule. Check your answer with a TA, please.



As each carbon is sp^2 hybridized, this molecule is planar. What you see above is essentially a top view of the molecule.

(b) OK, you almost certainly drew the "obvious" resonance form. Good. Now draw at least three others! Again, get your answers checked.



and many, many others

(c) Evaluate your new forms - Do you think they contribute substantially to the structure of benzene? Why or why not?

The answer here depends on what you drew. The ones in (b) above do not contribute strongly. They are relatively high energy forms because of charge separation, fewer bonds than the "cyclohexatriene" forms, or long pi bonds across the middle of the ring. pi bonds?Be certain you see that those long bonds are pi bonds and not sigma bonds.