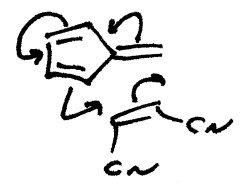
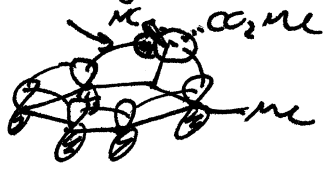
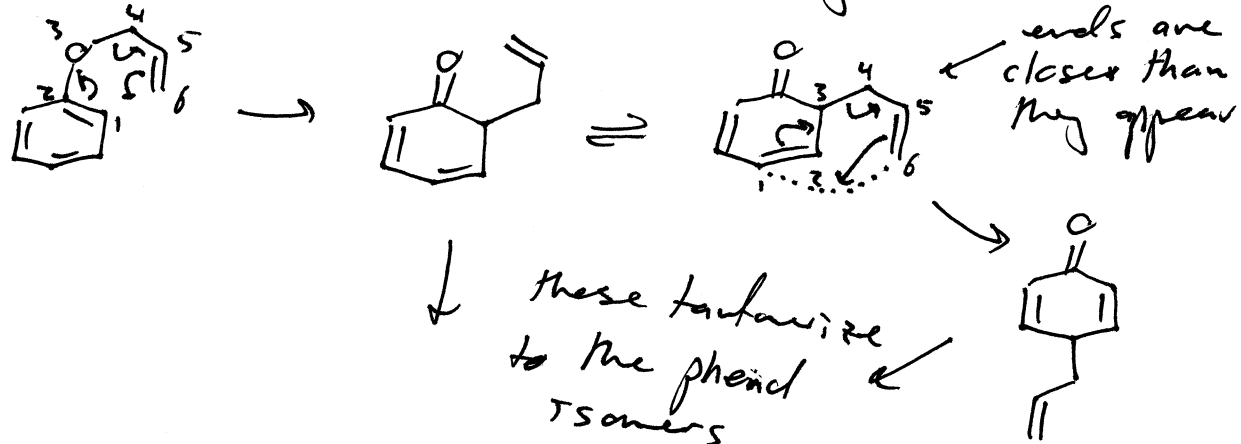


1. I'm going to take some shortcuts here because I don't need to practice drawing orbital arrays.
- (a) $8 e^-$ conrotatory ring closure - allowed thermally - then a $6 e^-$ disrotatory closure - also ...
- (b) That's an $8 e^-$ cycloaddition - $6 + 2$ 
That's forbidden (unless the dienophile can span the top & bottom faces of the triene, which seems unlikely).
- (c) left rxn TS a $[1,5] C$ shift with inversion of C stereochem
- via  That's a Möbius array (phase change marked " \rightarrow ")
with $6 e^-$ \therefore forbidden
right rxn TS a $6 e^-$ disrotatory opening - allowed
- (d) Didn't we do this in class? (Yes.)
- (e) That's a " $2+2+2$ " cycloaddition. This one can also be called a "homo-Diels-Alder" - the diene is not conjugated - there's an intervening CH_2 !
But please realize that this is rare & requires the diene π -bonds to be constrained spatially - ordinary non-conjugated dienes don't do this.
- allowed - $6 e^-$ Hückel array
- 2nd (e) - oops - 1st step is a conrotatory $4 e^-$ opening - that's allowed; 2nd is a $4+2$ cycloaddition - also allowed.
- (f) Wow! that is tough to see - it's a $[1,5]$ shift of C with inversion - \therefore forbidden.

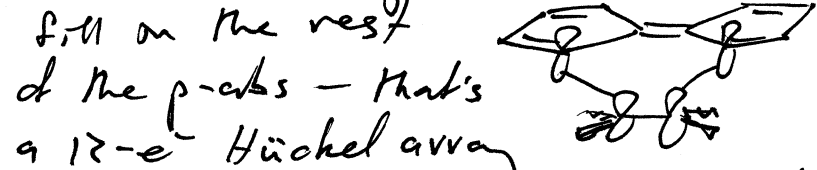
7. (a) $4-e^-$ concerted closure, then a $4-e^-$ concerted opening!

(b) cope ($[3,3]$ sigmatropic shift)

(c) Claisen - here, the aromatic ring behaves as if it had double bonds + single bonds.

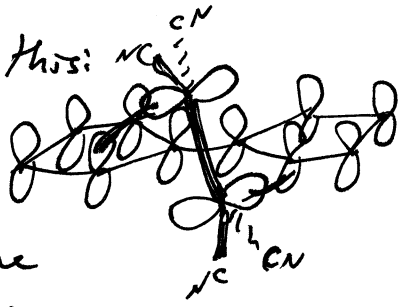


(d) This one would be forbidden if it went on the usual way -



- no good. But - how about this:

one new σ -bond forms on the top face of the conjugated π -system; the other on the bottom face - color in the orbs - that's a $12-e^-$ Möbius array \therefore allowed -



→ Hs end up trans

(e) D-A \rightarrow



sorry about the arrows - that's a retro-DAA that extrudes N_2 !

(f) Allowed - $4+2$ - D-A rxn! Major prod. is endo

