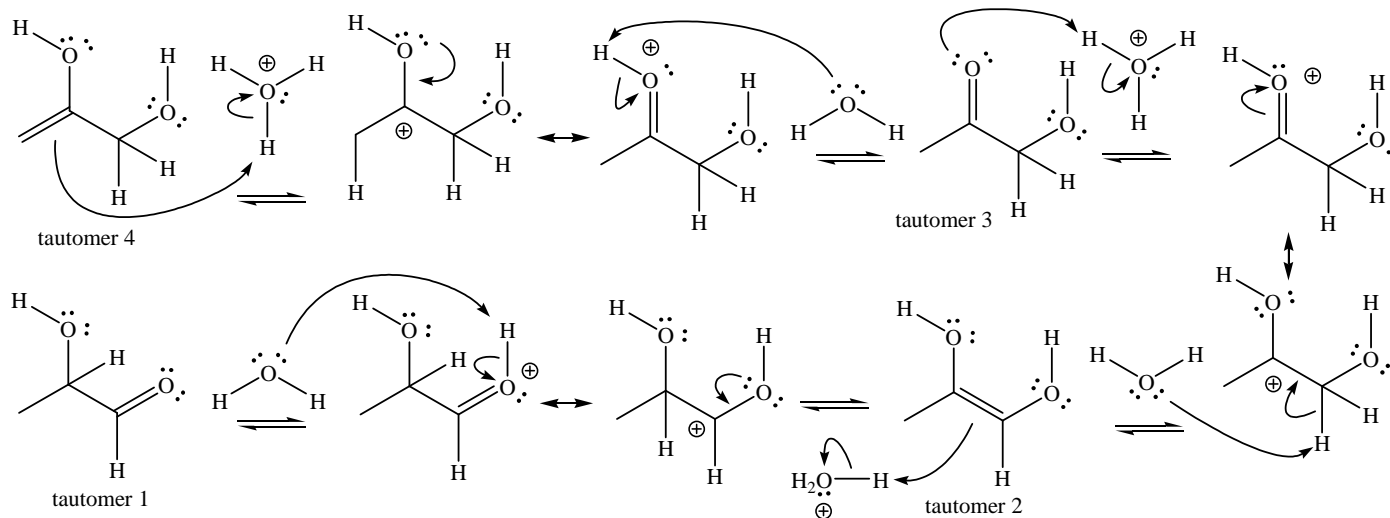
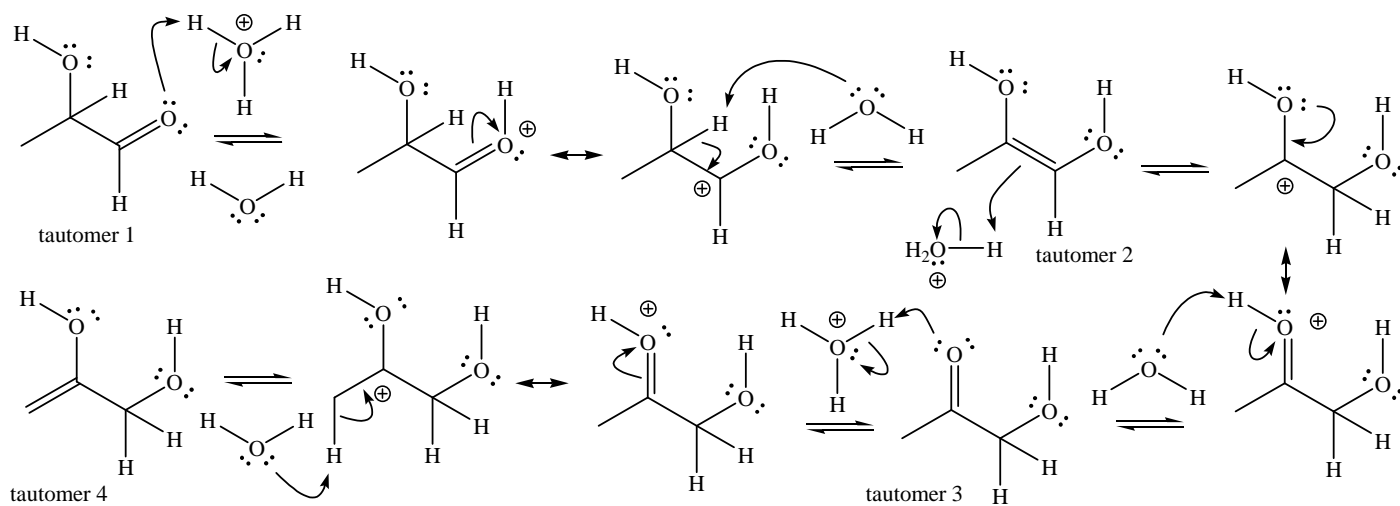
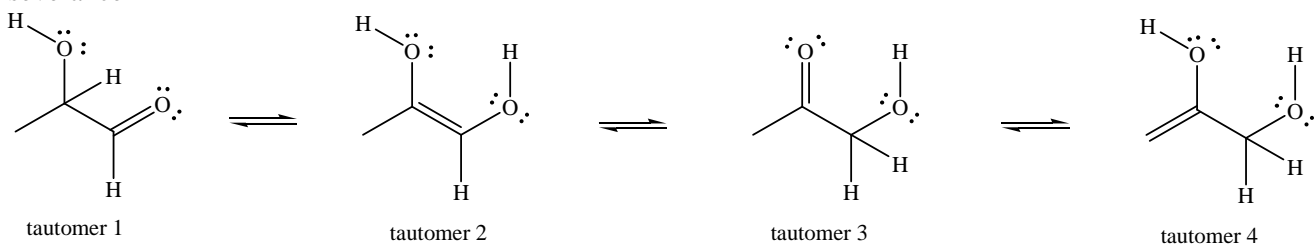
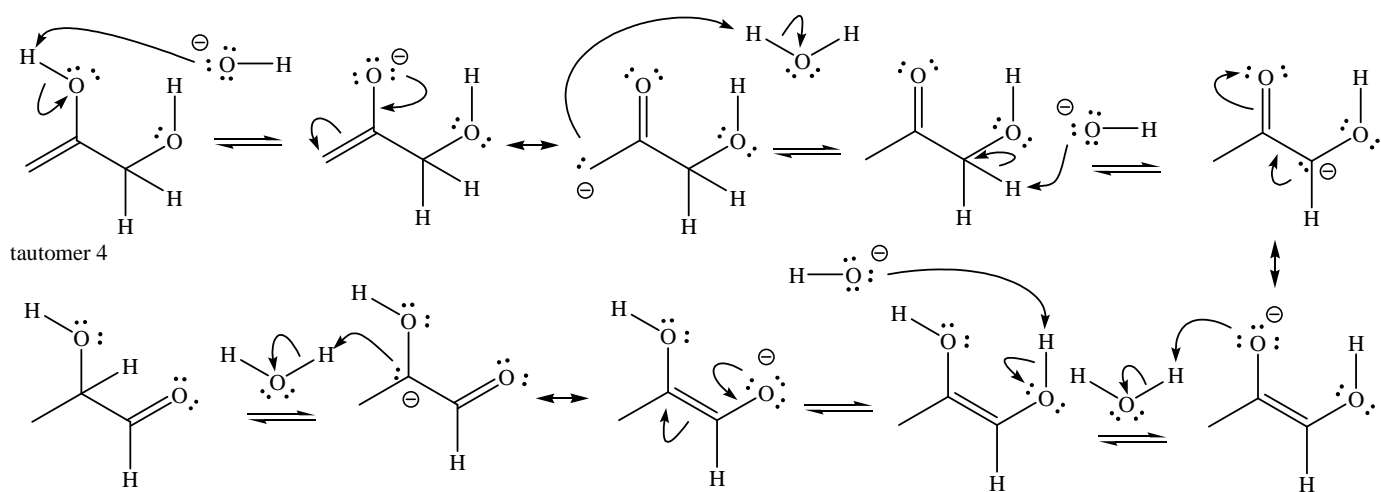
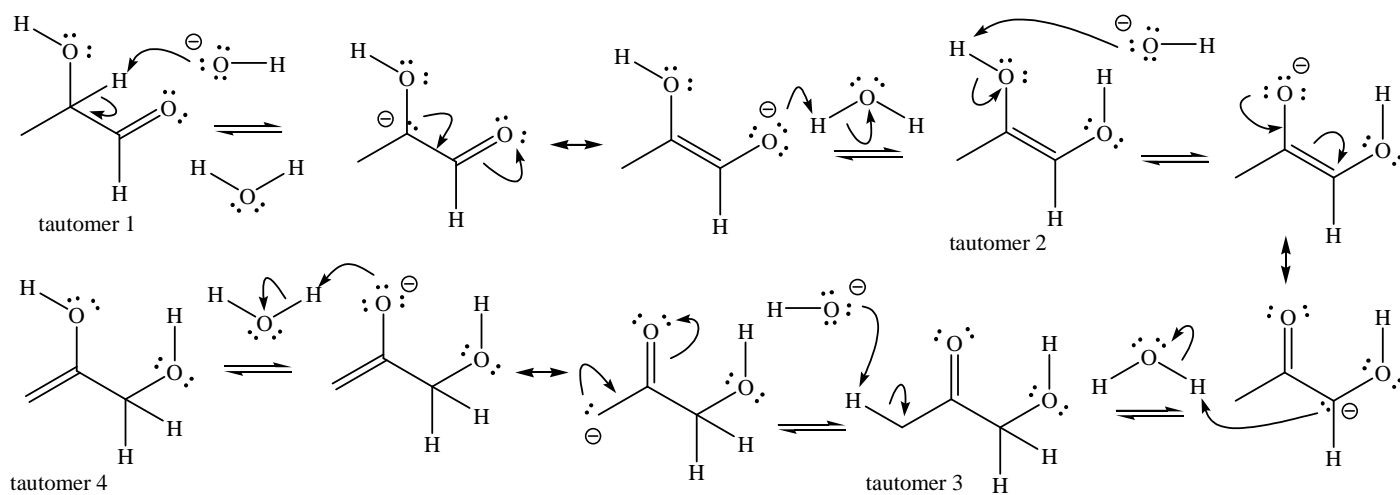
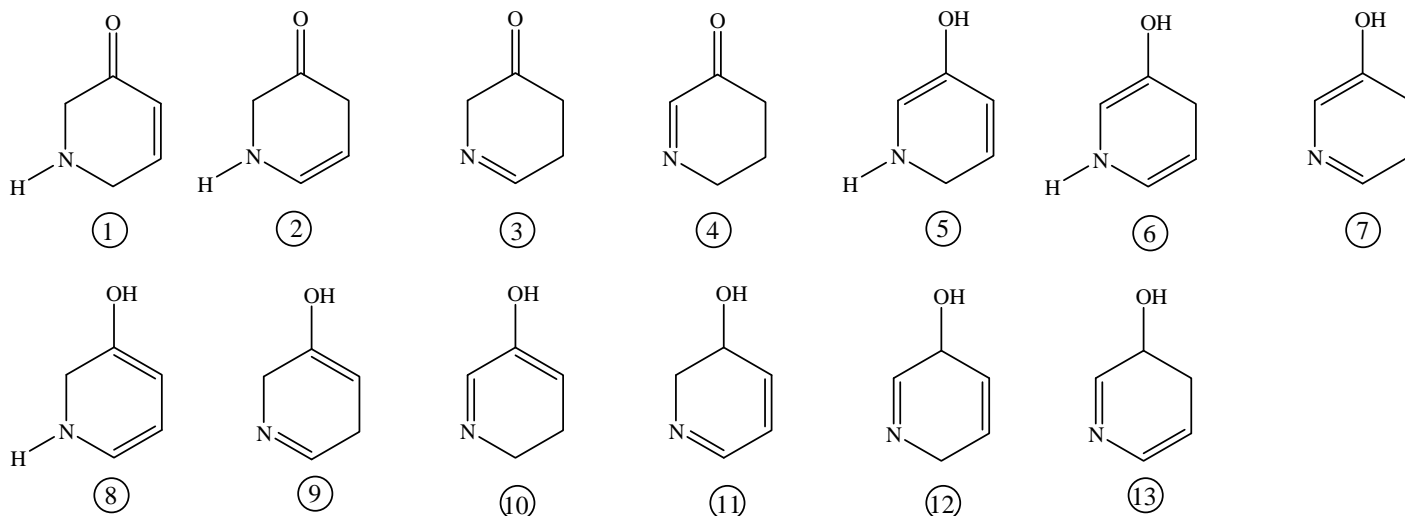


Tautomers in acid and in base

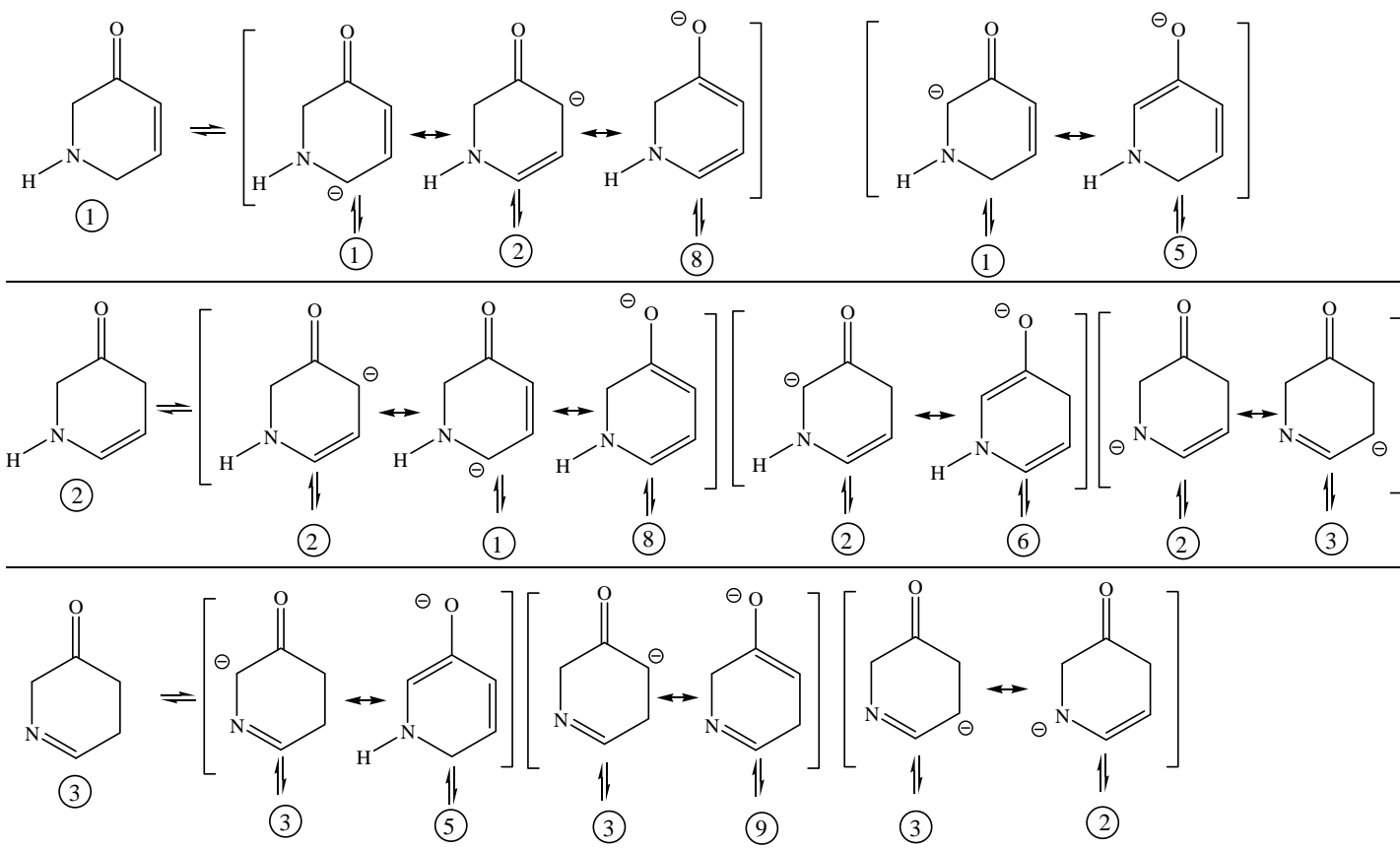
Perseverance



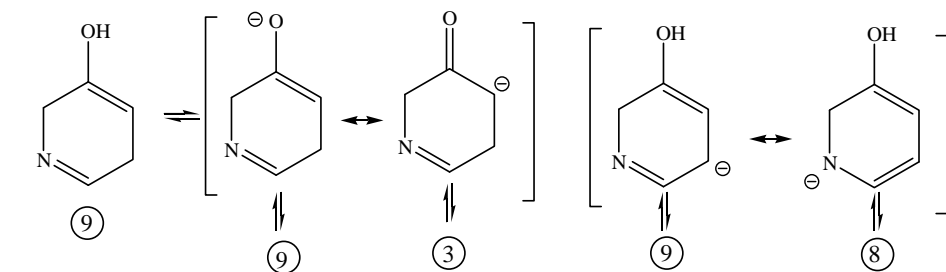
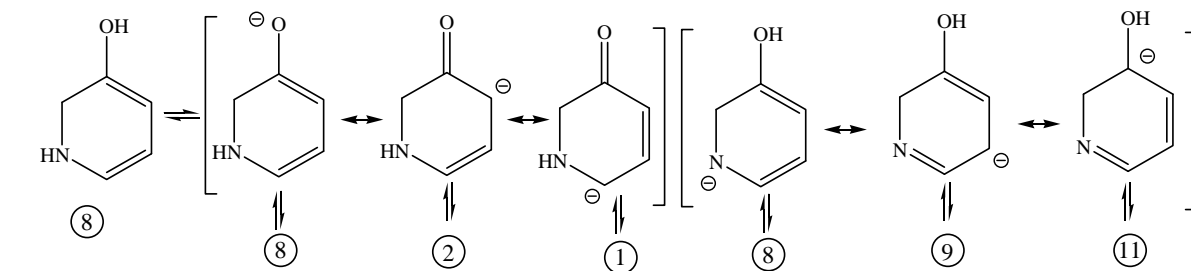
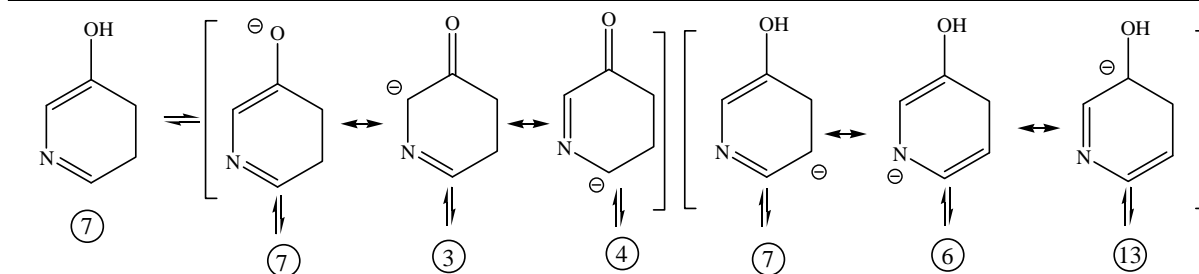
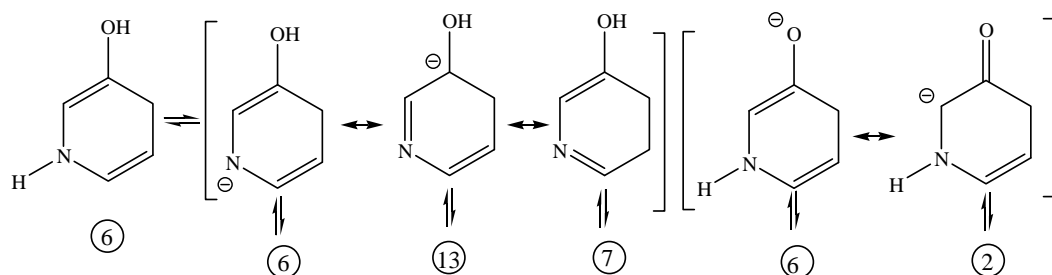
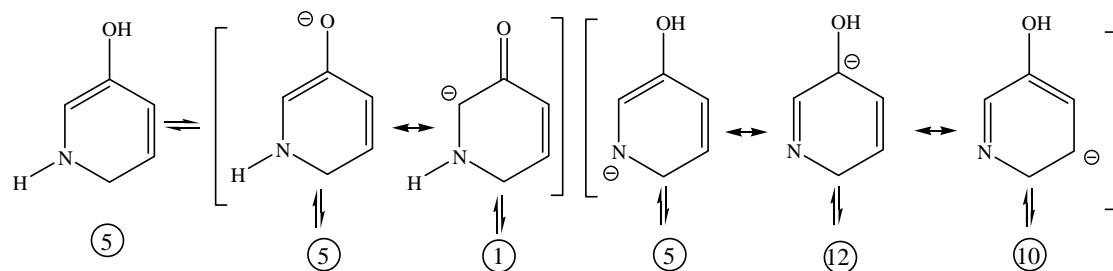
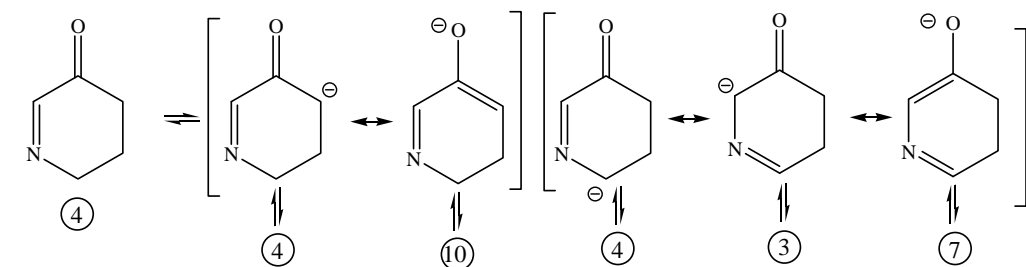


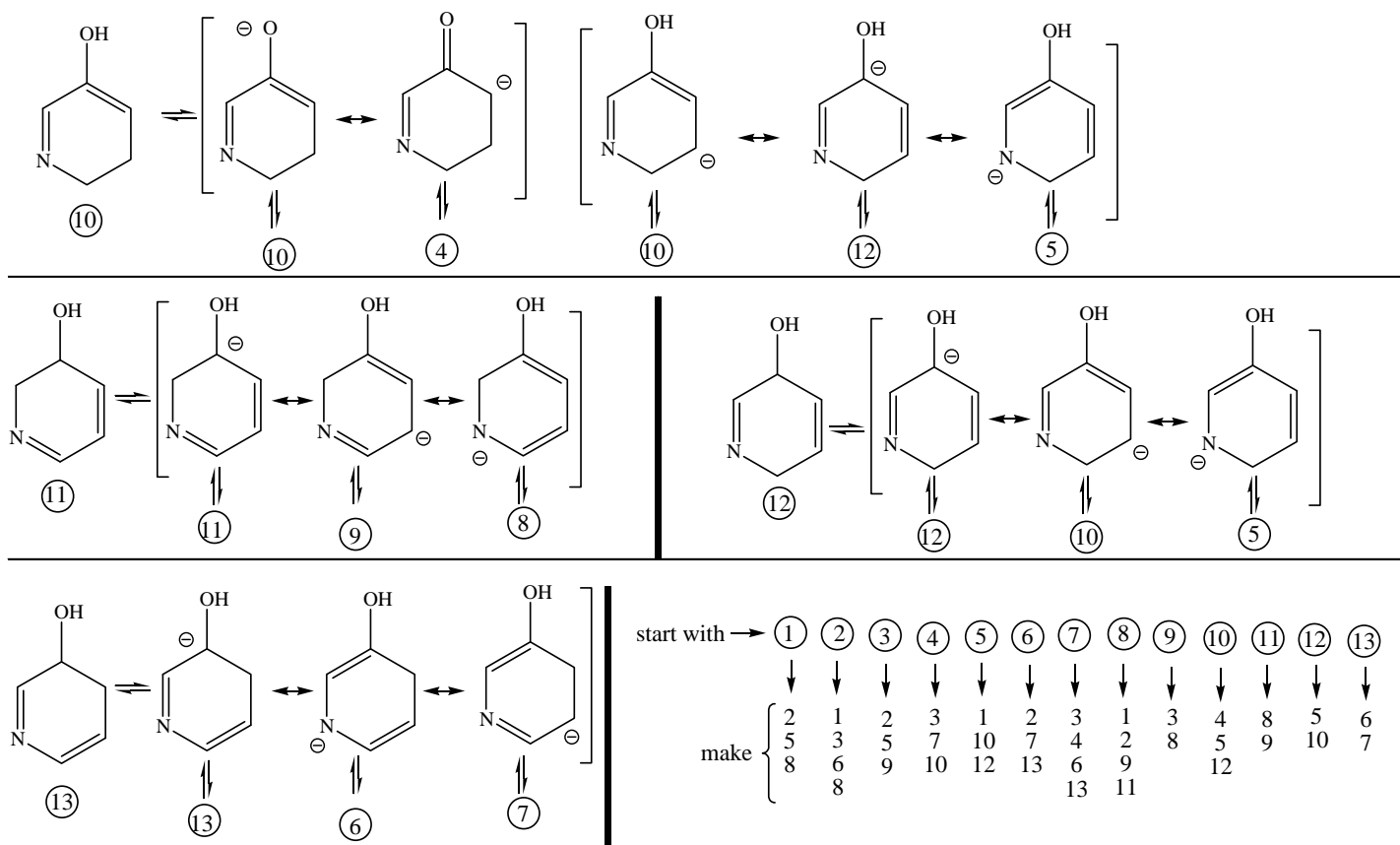
**Complicated tautomer problem #1.****Possible tautomers.** (all tautomers can interchange in acid or base, forward and backwards)

All possible reactions in base

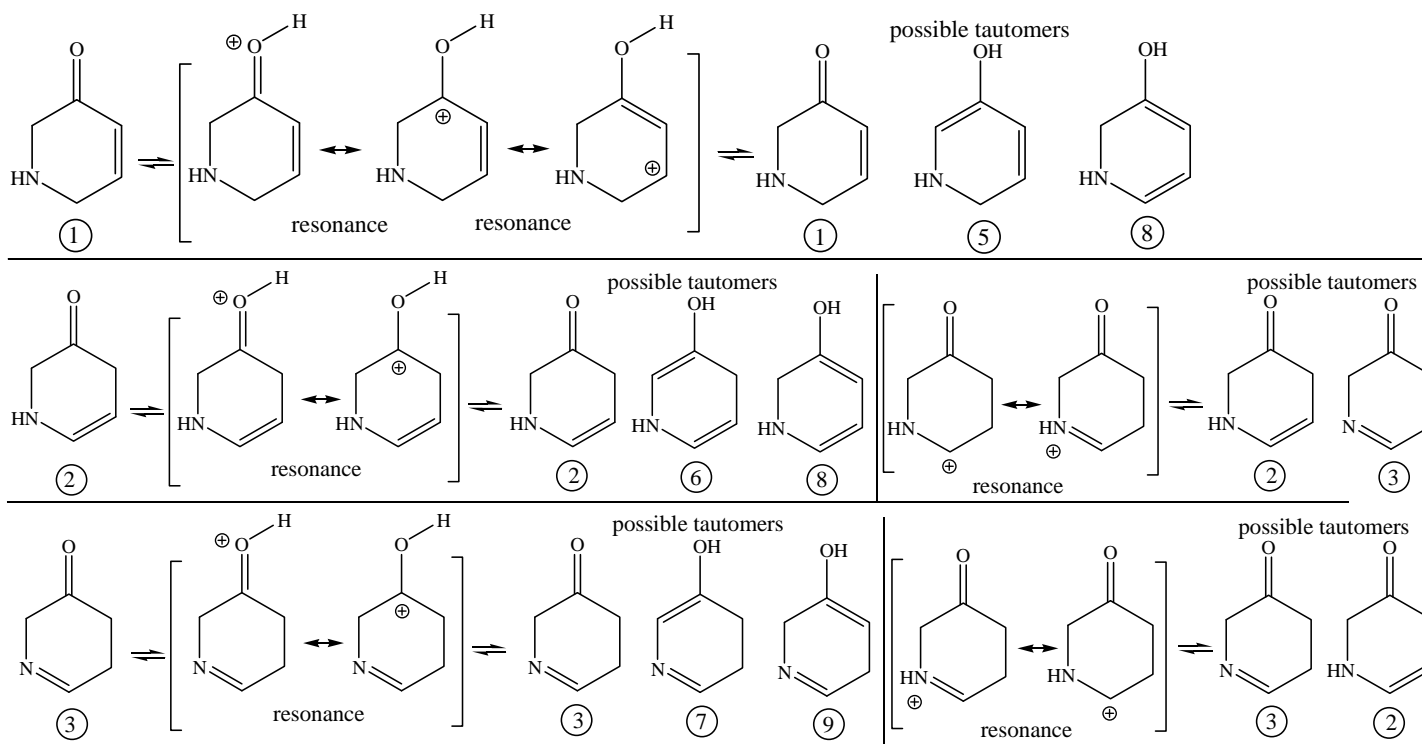


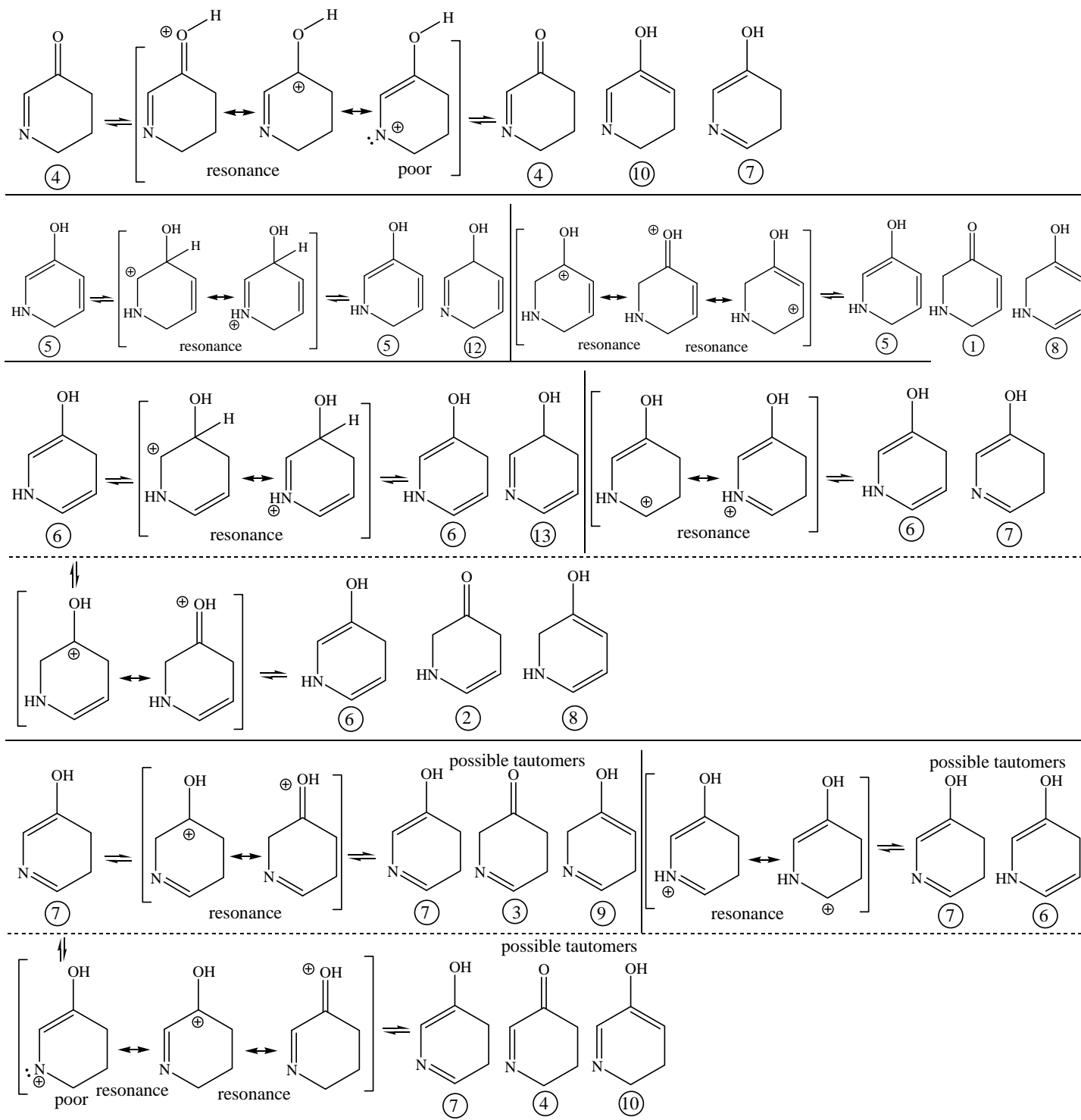
## 314 Arrow Pushing practice/Beauchamp

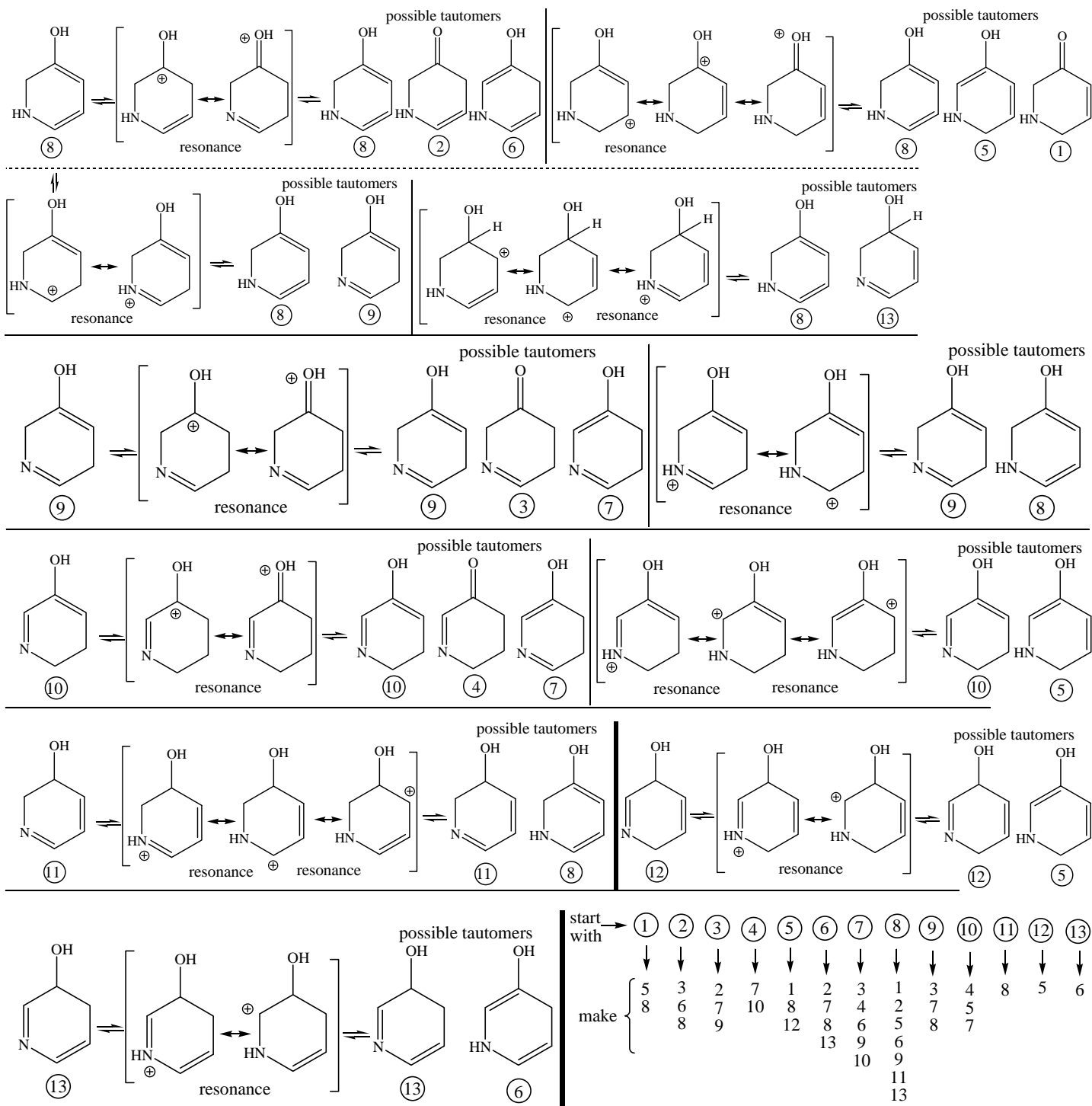




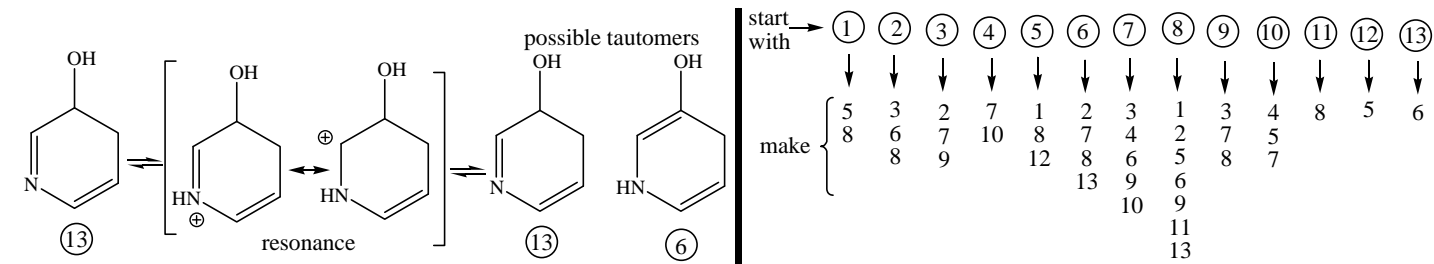
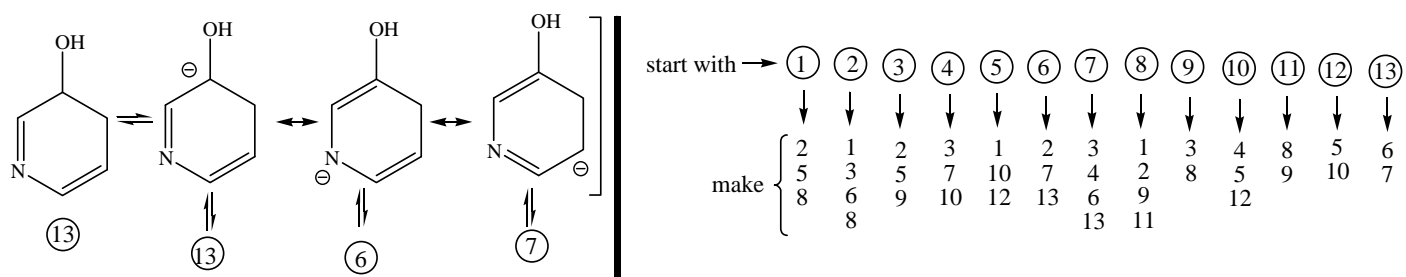
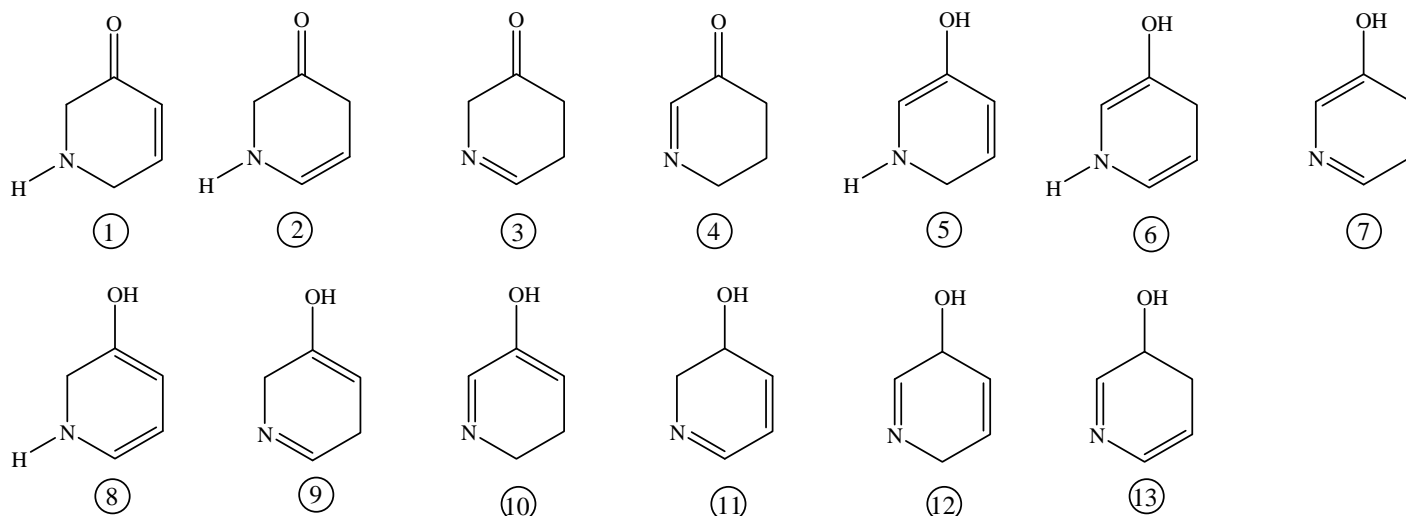
All possible reactions in acid.



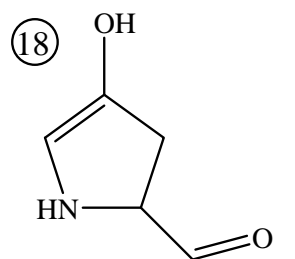
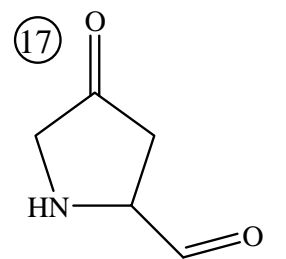
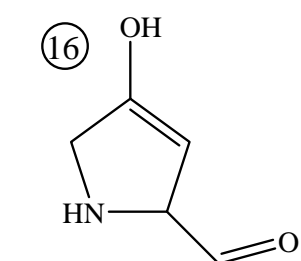
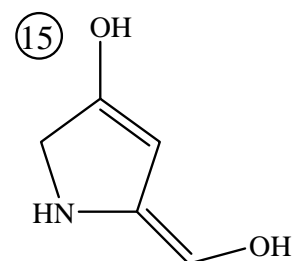
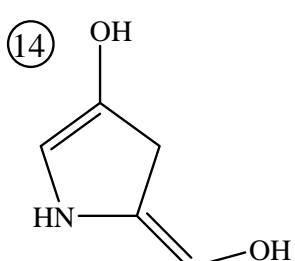
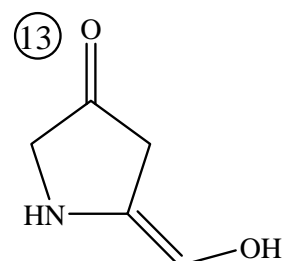
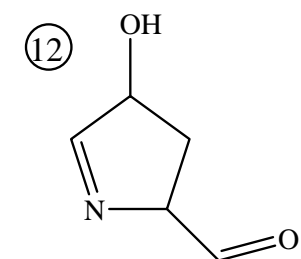
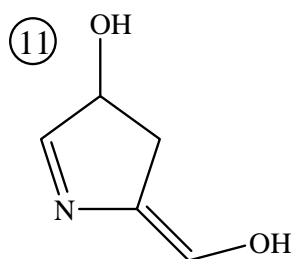
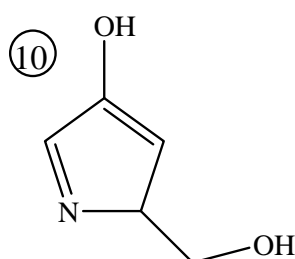
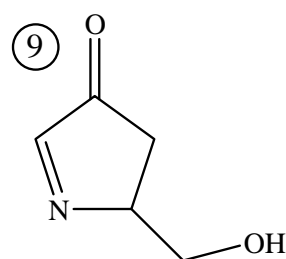
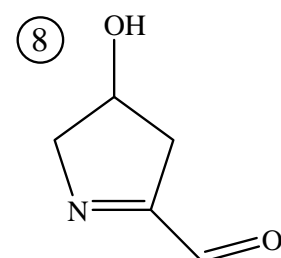
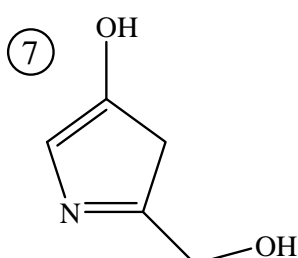
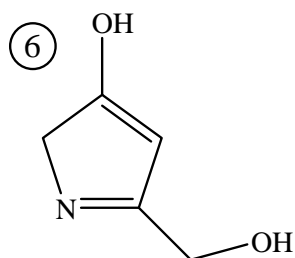
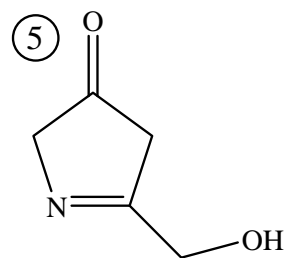
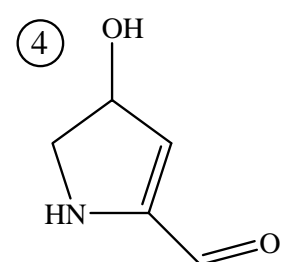
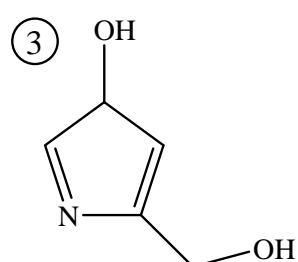
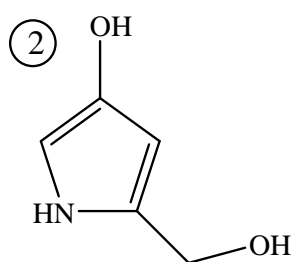
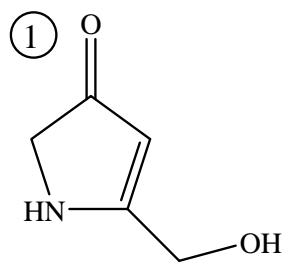




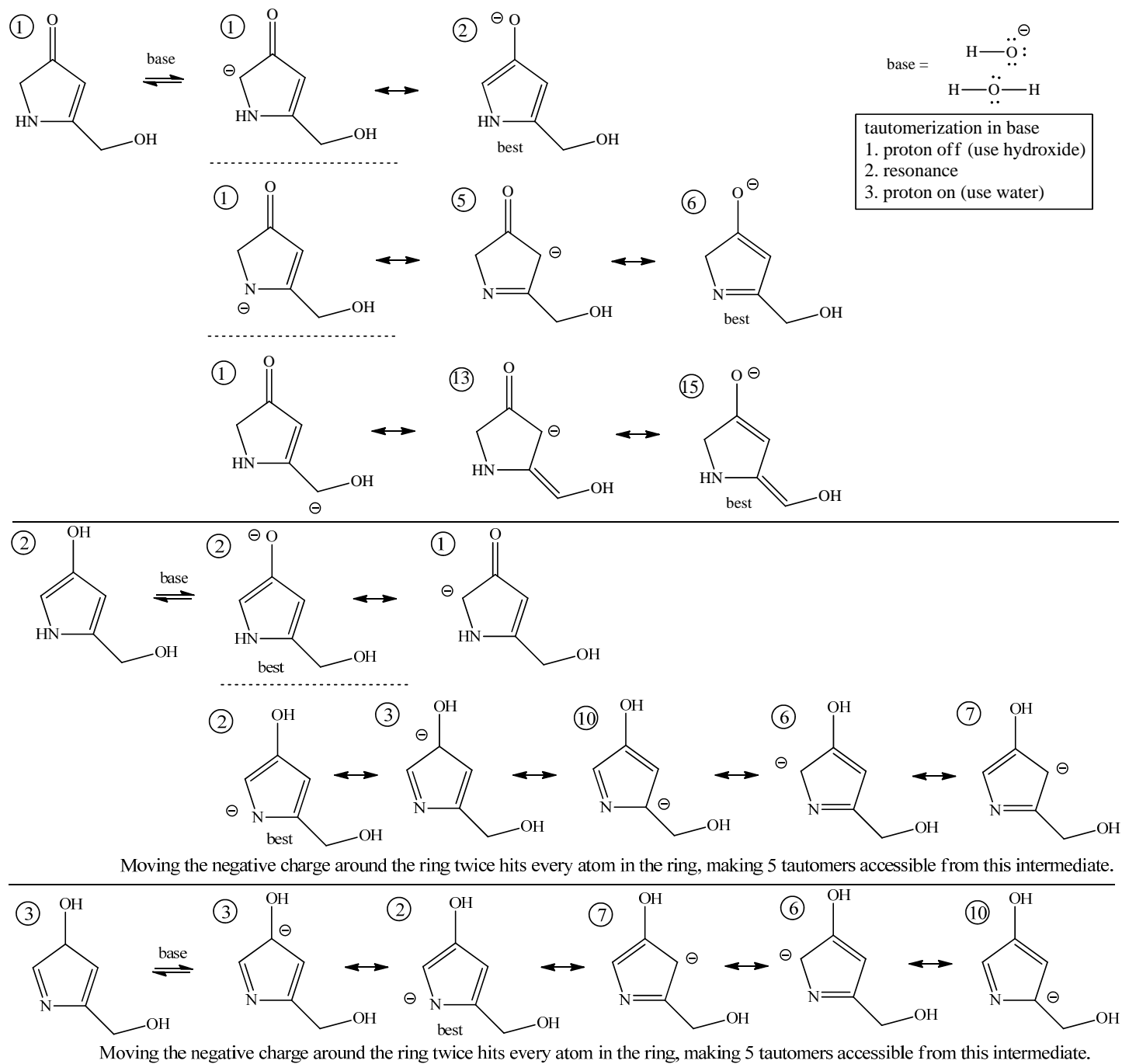
314 Arrow Pushing practice/Beauchamp



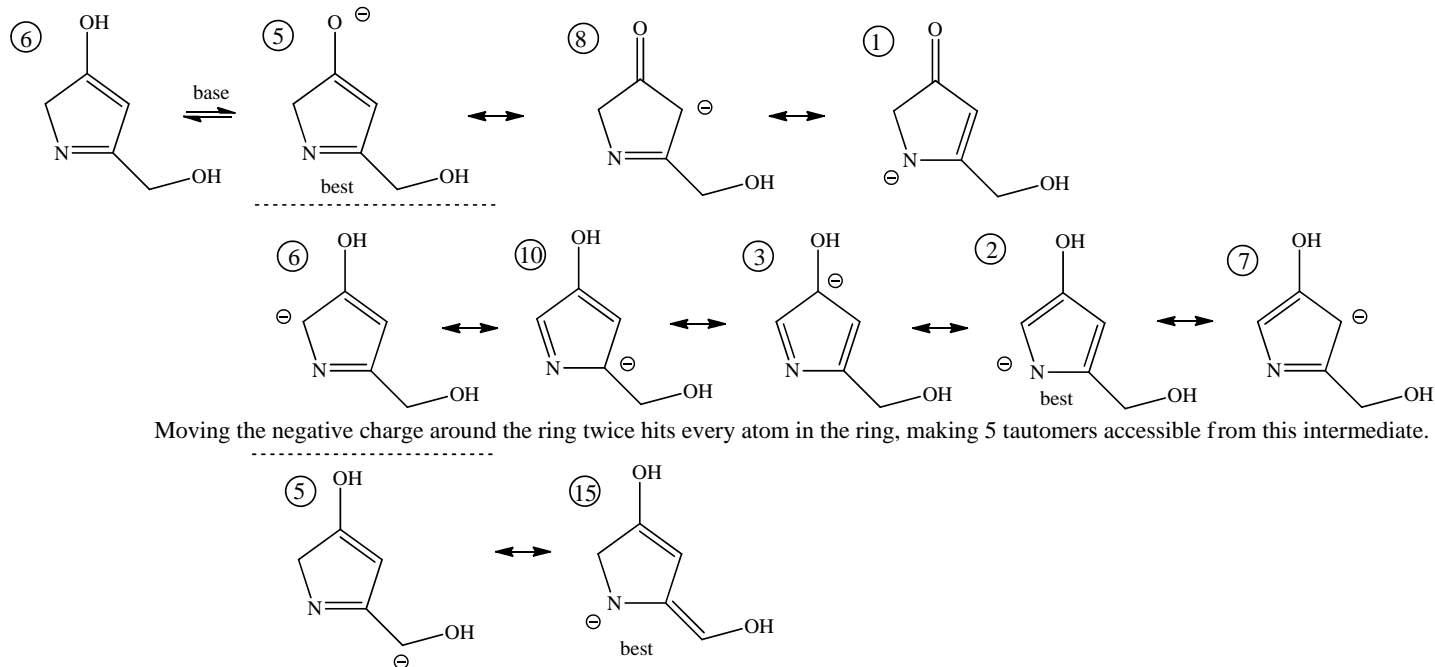
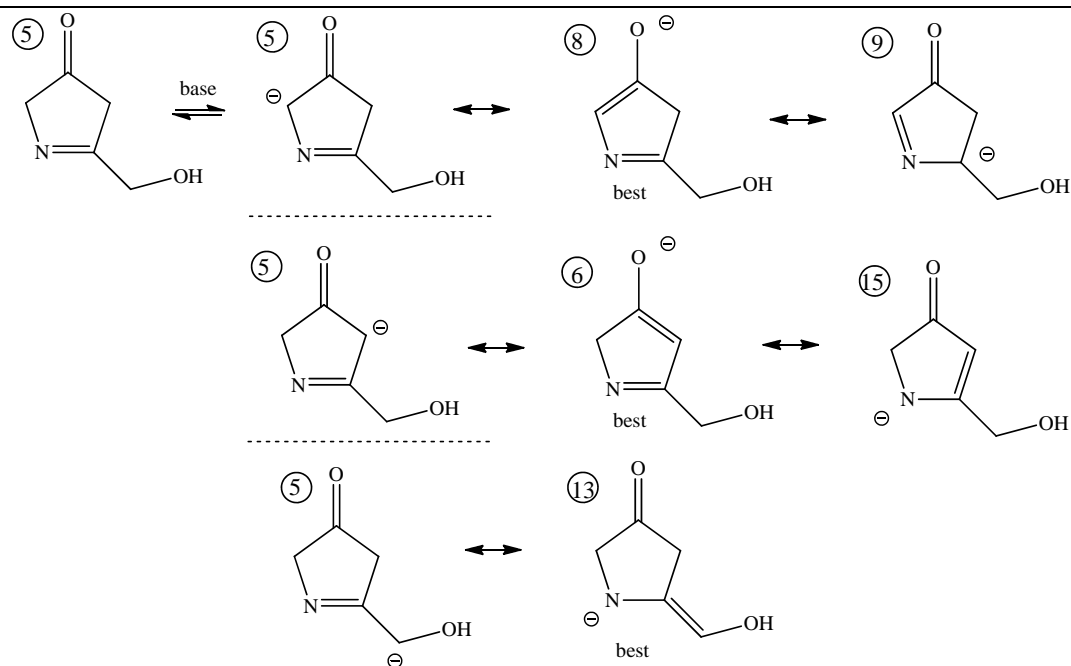
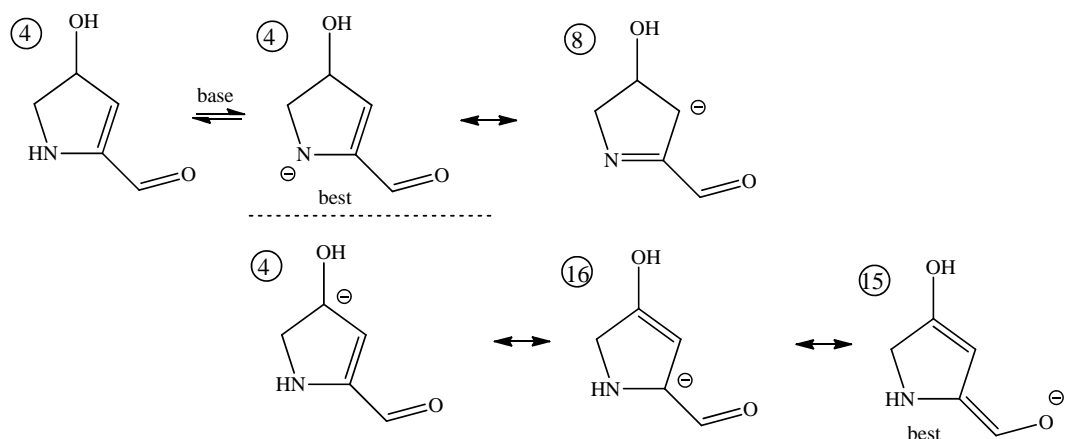


**Complicated tautomer problem #2.**

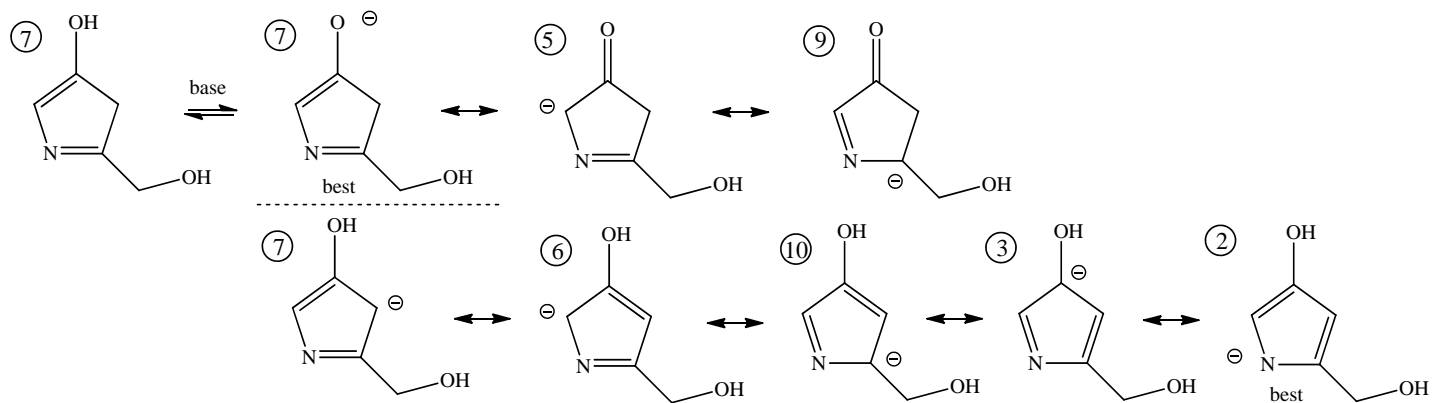
**Tautomer reactions in base.** The location of the negative charge is the site where protonation would occur, leading to the tautomer indicated by the indicated number.



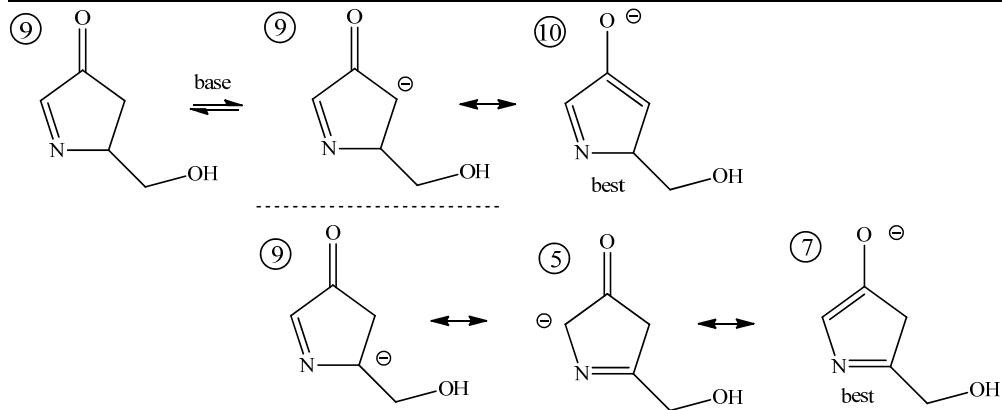
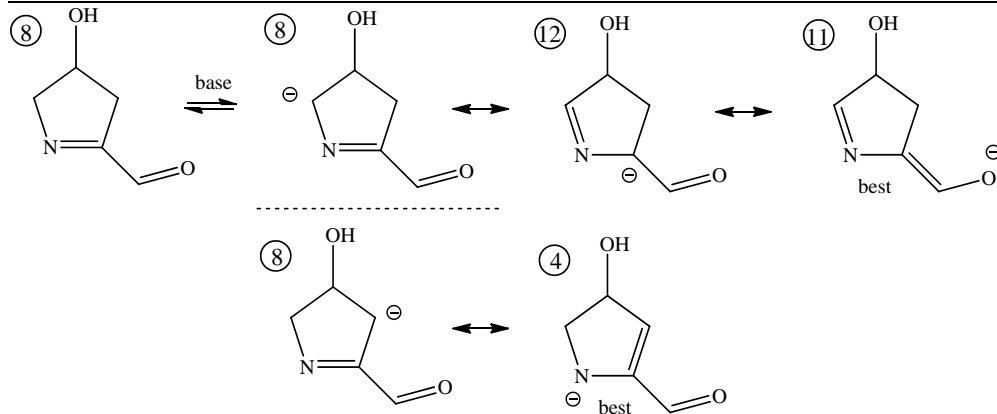
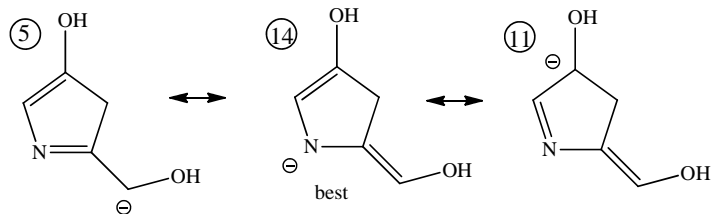
## 314 Arrow Pushing practice/Beauchamp

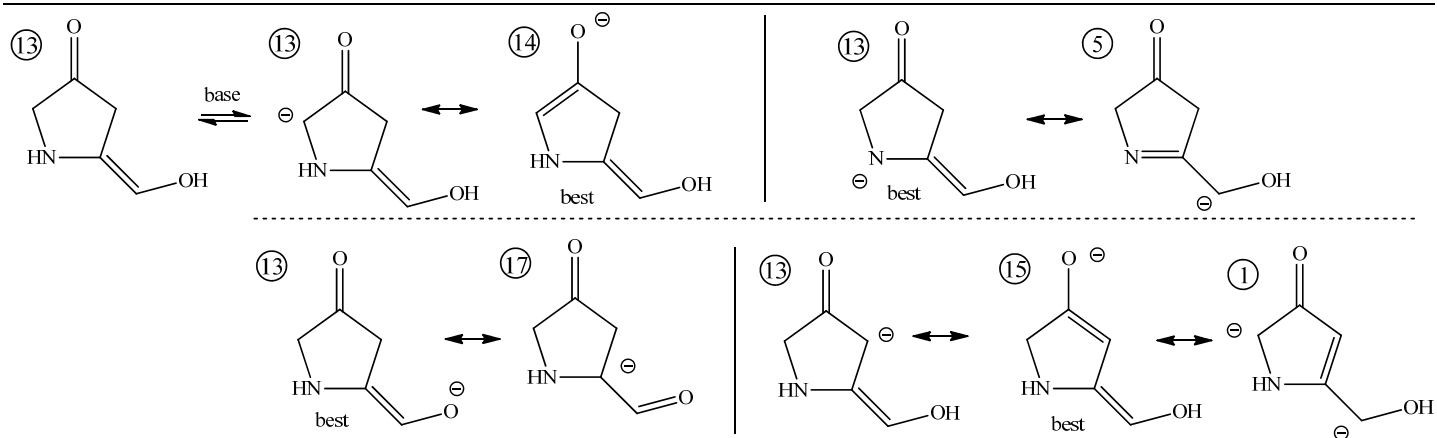
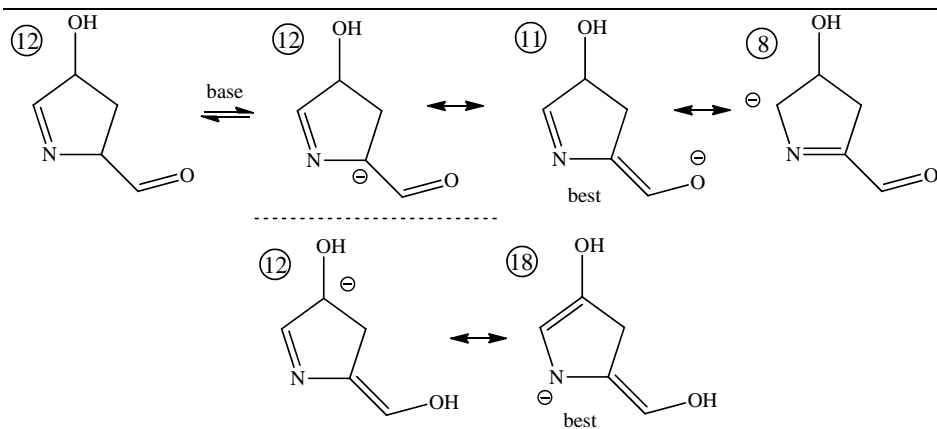
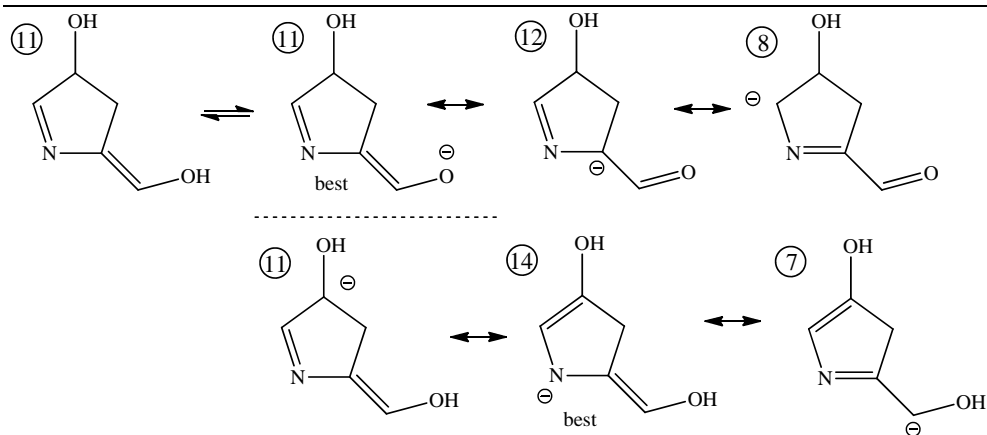
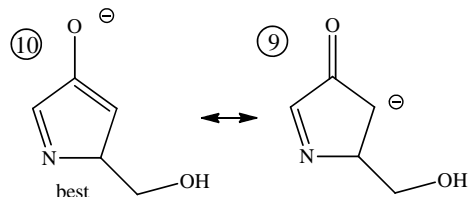
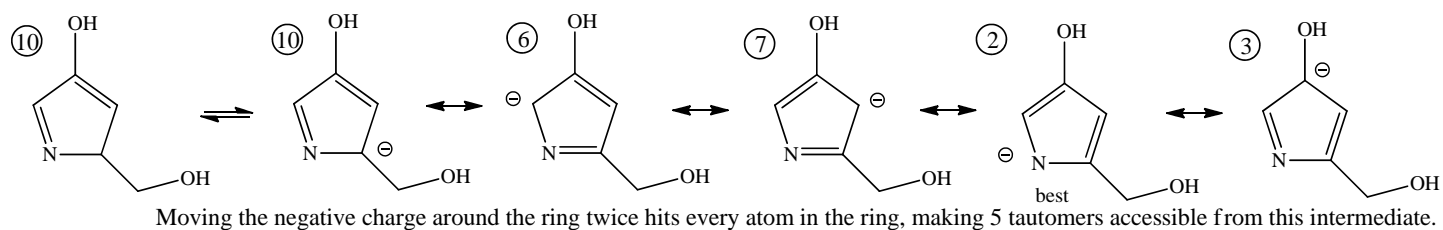


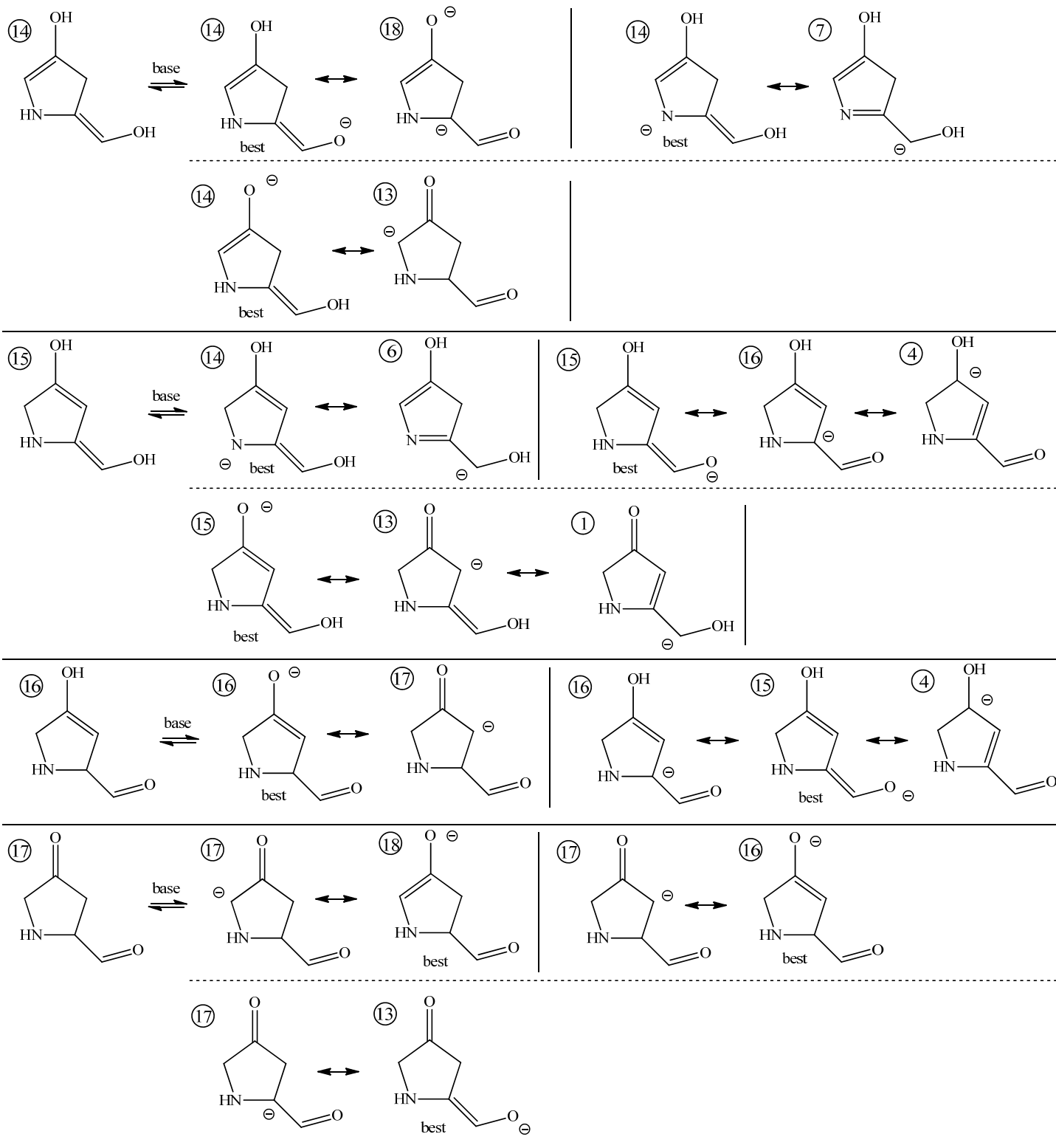
## 314 Arrow Pushing practice/Beauchamp

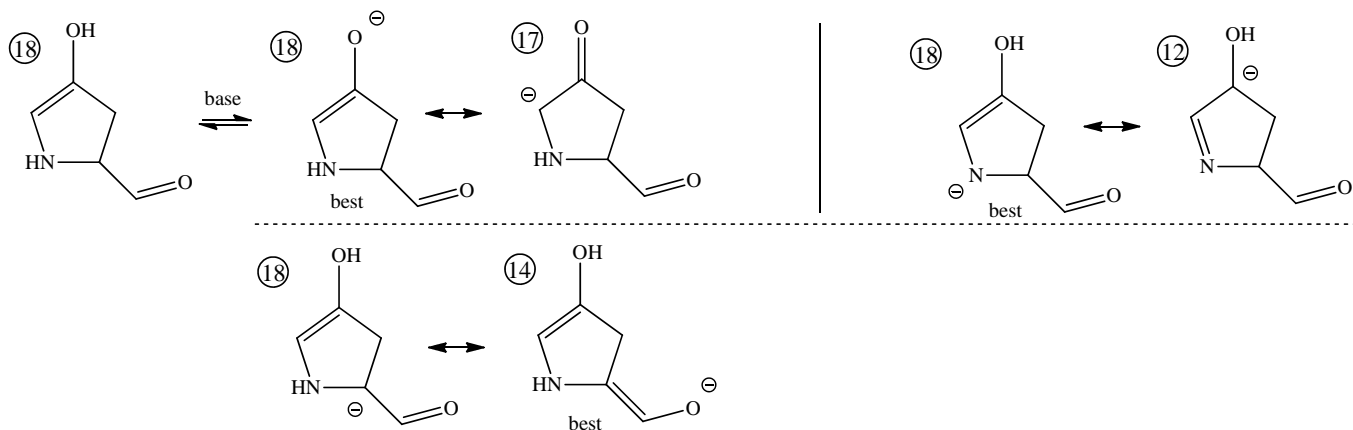


Moving the negative charge around the ring twice hits every atom in the ring, making 5 tautomers accessible from this intermediate.









It's very tricky working through all of the possibilities. As best as I could I tried to include all of the possible tautomers that could be made in one step from each starting tautomer. I included the original tautomer first and then other possibilities. All of the tautomers are not in resonance with each other. There will be different protons that can be removed, leading to various possible tautomers. You can look at each example above to find the exact possibilities. This took a long time and I don't know if I will be able to construct the acid possibilities. I actually have other stuff to do in my life. As usual, consider my examples with a cautious eye for mistakes that I might have made. I would appreciate if you could point those out to me. Thanks.

- ① → ① ② ⑤ ⑥ ⑬ ⑮  
 ② → ② ① ③ ⑥ ⑦ ⑩  
 ③ → ③ ② ⑥ ⑦ ⑩  
 ④ → ④ ⑥ ⑧ ⑮ ⑰  
 ⑤ → ⑤ ⑥ ⑧ ⑨ ⑬ ⑮  
 ⑥ → ⑥ ① ② ③ ⑦ ⑧ ⑩ ⑮  
 ⑦ → ⑦ ② ③ ⑤ ⑥ ⑨ ⑩ ⑪ ⑭  
 ⑧ → ⑧ ④ ⑪ ⑫  
 ⑨ → ⑨ ⑤ ⑦ ⑩  
 ⑩ → ⑩ ② ③ ⑥ ⑦ ⑨  
 ⑪ → ⑪ ⑦ ⑧ ⑫ ⑭  
 ⑫ → ⑫ ⑧ ⑪ ⑮  
 ⑬ → ⑬ ① ⑤ ⑭ ⑮ ⑰  
 ⑭ → ⑭ ⑦ ⑬ ⑮  
 ⑮ → ⑮ ① ④ ⑥ ⑬ ⑰  
 ⑰ → ⑰ ④ ⑮ ⑰  
 ⑱ → ⑱ ⑬ ⑰ ⑱  
 ⑳ → ⑳ ⑫ ⑭ ⑱

