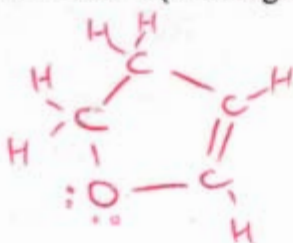
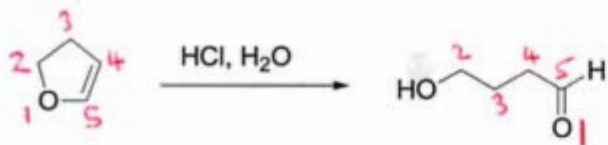


1-2) Draw a correct Lewis structure (showing all hydrogens and including all lone pairs) for the molecule below.



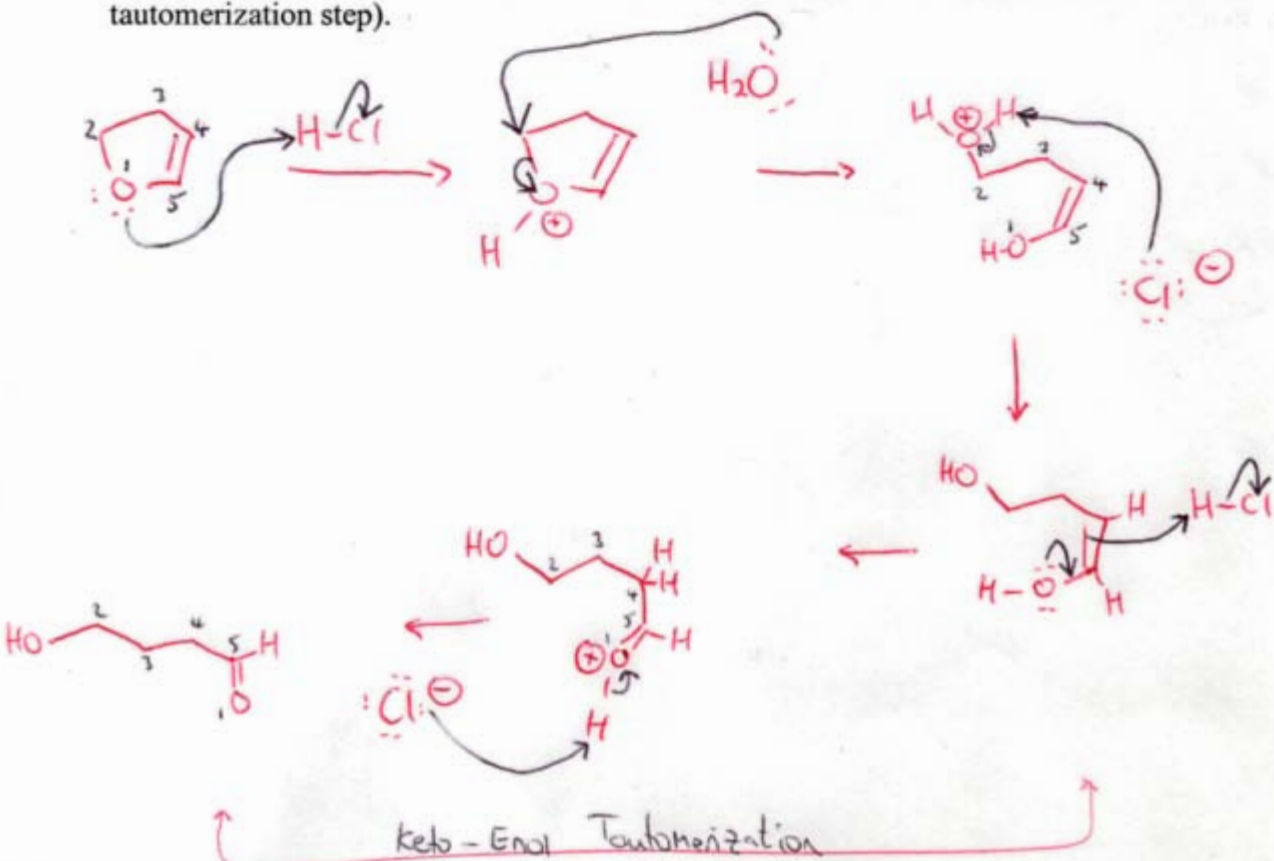
3-12) When treated with aqueous acid, this compound generates the hydroxy-aldehyde shown below.



-Number the atoms in the starting material, and the product. ✓

-Assuming the 1st step is protonation of the ring oxygen, write the full mechanism for this reaction.

(Bear in mind the reaction conditions, and that the correct answer should also include a tautomerization step).



13-16) DBU (shown below) is a very common organic base used for dehydrohalogenation reactions.

i) Draw the product of protonation on the different Nitrogens, and (ii) decide which Nitrogen is the more basic.



ii) The lower Nitrogen is more basic, it leads to a more stable (resonance stabilized) product upon protonation.

17-20) Write the mechanism for the following transformation.

