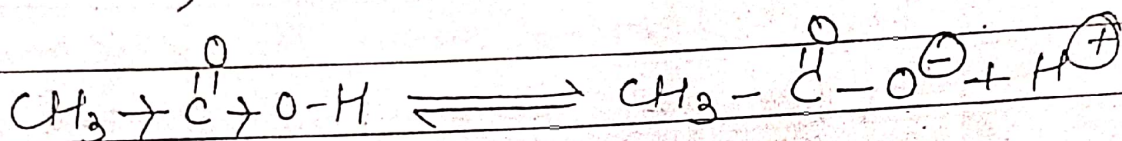
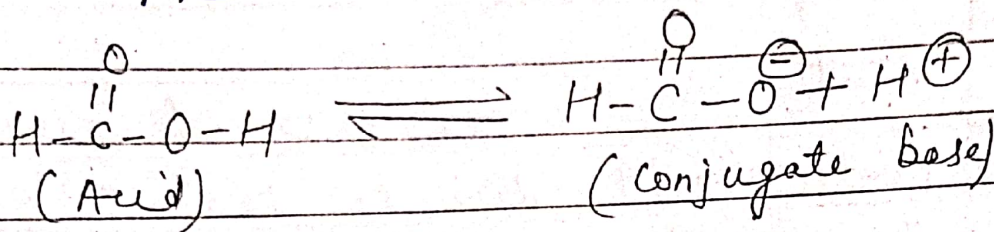


* Application: \rightarrow (-I effect) Page No. _____
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(1) By inductive effect, the acidic and basic strength of carboxylic acid and amines can be explained.

e.g. (1) Formic acid is stronger than acetic acid: \rightarrow

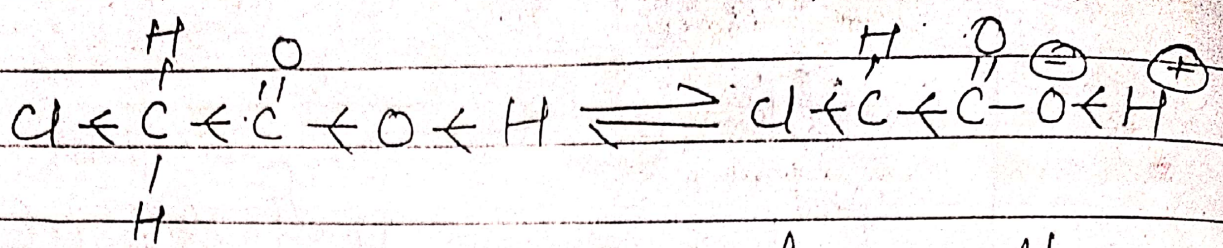


In case of acetic acid the electron density on oxygen atom of OH group becomes higher due to +I effect of the CH₃ group. So, O-H bond becomes stronger and release of H⁺ decreases. Its conjugate base, acetate ion is also destabilised by this effect because of the high electron density on -vely charged oxygen atom due to the +I effect of methyl group. So, equilibrium in this case mostly shifted towards L.H.S and its acidic strength is weaker.

In case of formic acid there is no +I effect. O-H becomes more polar and release of H⁺ is more. Its conjugate base is also stabilised by dissipation of charged. So, equilibrium in this case mostly shifted towards R.H.S and it is stronger acid.

(11)*

Chloroacetic acid is stronger than acetic acid →

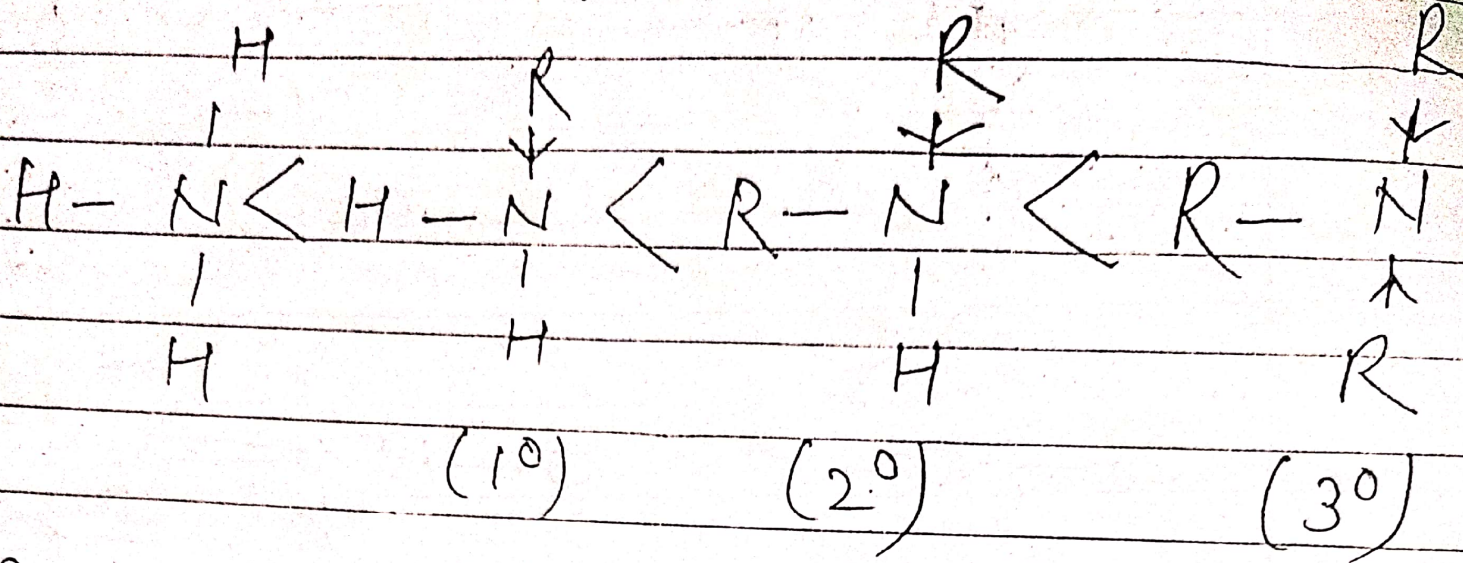


In case of monochloro-acetic acid due to the -I effect of the chlorine atom. The electron density on oxygen atom gets decreased and O-H bond becomes lengthened and weaker. So, release of H⁺ is more and more. It's conjugate base is also stabilised to a greater strength by the dissipation of -ve charged due to the +I effect of chlorine atom. So, equilibrium is shifted more towards R.H.S and it is a stronger acid.

Higher the strength of +I effect in a molecule higher will be its effect. Ex - in trichloro acetic acid the O-H bond length will be max^m its bond energy will be minimum and its conjugate base will also be stabilised to a max^m extent so, its acidic strength will be max^m in this series. Dichloroacetic acid will be less acidic than trichloro due to lesser +I effect caused by two chlorine atoms only. Therefore, all acids

* Basic Strength \longrightarrow

Date: / /



(Basic strength should increase)

Application! \longrightarrow

The availability of electron pair on nitrogen atom in alkyl amines increase due to +I effect of the Alkyl group. So, its basic strength also increases. If the +I effect is more than its strength will also be high as shown in the above series. However, in case of amines the basic strength is solvent affected.