Important Questions 1.

(From Previous Year)

For Degree-I (Sub.)

Explain the following :- 07/08/2020

a. Methyl amine is stronger base than ammonia.

Ans. Methyl amine Ammonia

$H_3C \overset{+I}{\rightarrow} \ddot{N}H_2$ $\ddot{N}H_3$ or $H-\ddot{N}H_2$

* Since, in both has lone pair of electron on nitrogen atom, methyl amine as well as ammonia behave as lewis base.

But, in case of methyl amine, due to electron releasing nature of CH_3- group the electron density on nitrogen of methyl amine is higher than NH_3, because no electron releasing group attached with nitrogen of NH_3.

Again, conjugate acid of $\ddot{N}H_3$ is $\overset{\oplus}{N}H_3$ which is less stable than the conjugate acid of $H_3C-\ddot{N}H_2$ which is $R-\overset{\oplus}{N}H_3$.

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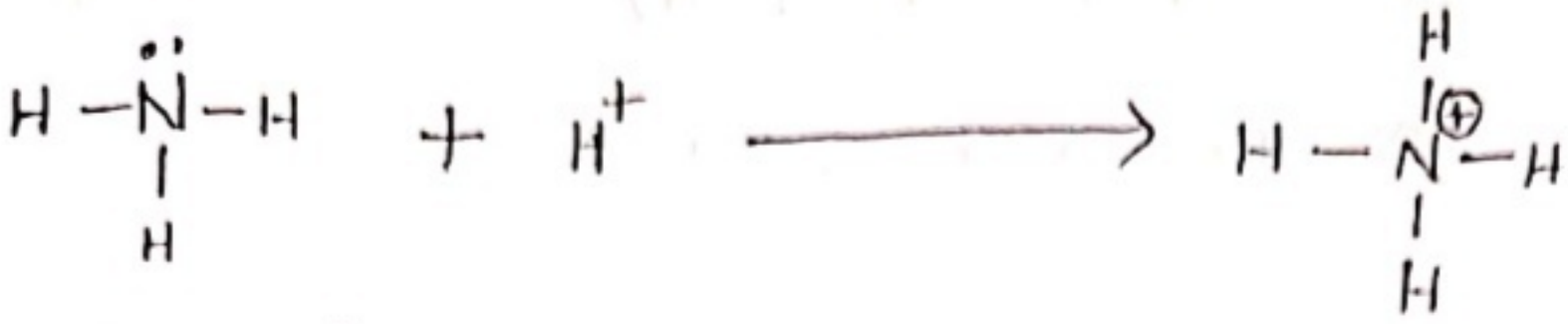
Therefore methyl amine is stronger base than NH_3.



Ammonia

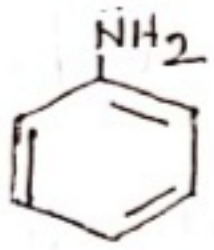
Conjugate acid

Conjugate acid

b. Methyl amine is stronger base than aniline.

Ans. $H_3C \rightarrow \ddot{N}H_2$

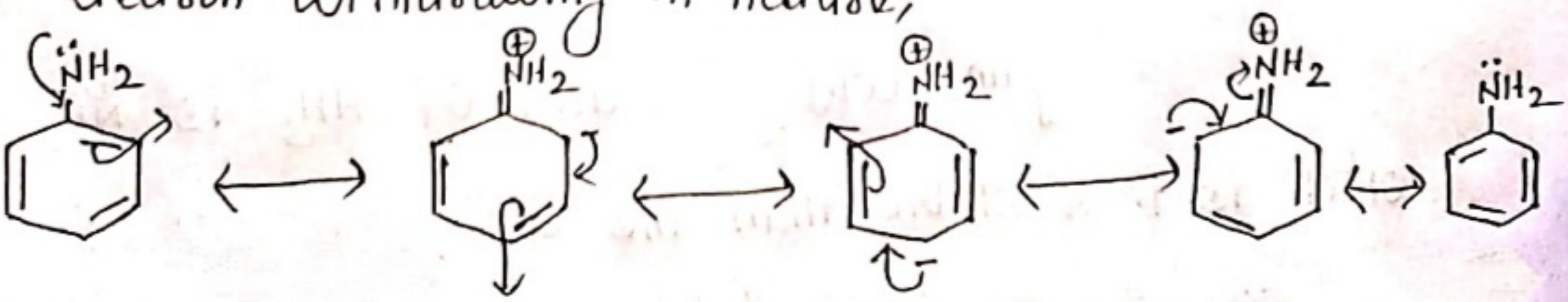
Methyl amine



Aniline

In methyl amine electron density of 'N' is increases due to +I effect of CH_3 group thus, increases the basic strength.

But in the case of aniline phenyl ring is electron withdrawing in nature,



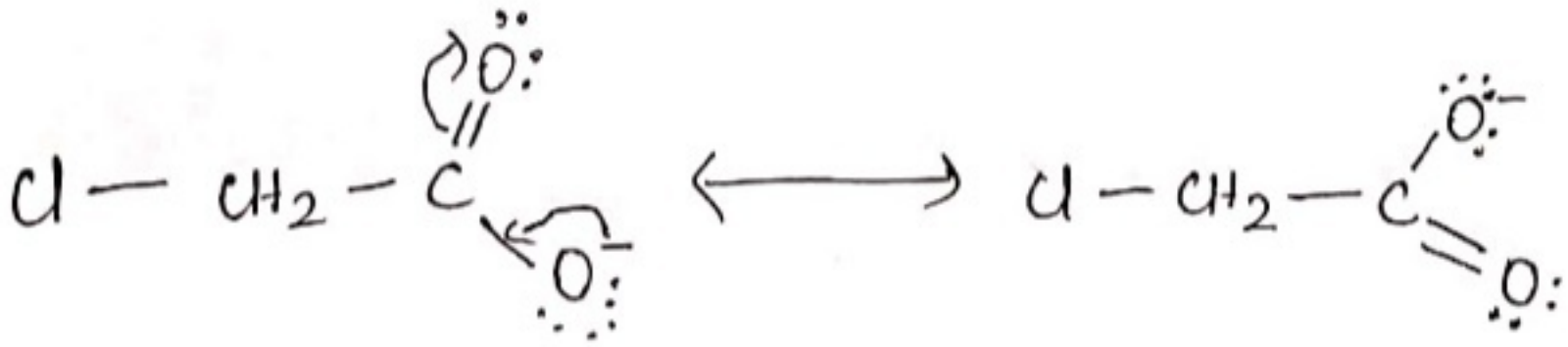
Thus decreases the electron density on nitrogen of NH_2 group, and decreases the basic strength. On other hand the conjugate acid of CH_3-NH_2 is stabilised due to inductive effect but conjugate acid of aniline is anilinium ion which has only two resonating structure, Hence not more stable.

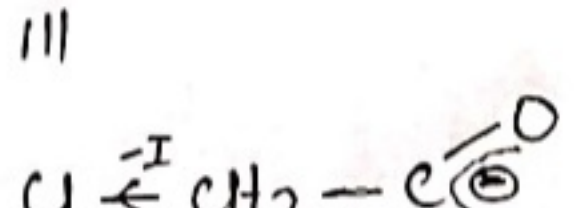
C. Chloroacetic acid is stronger than acetic acid.

Ans. $Cl-CH_2-COOH$ $\qquad$ $H-CH_2-COOH$

Chloroacetic acid $\qquad$ acetic acid

* The conjugate base of chloroacetic acid is $Cl-CH_2-C(=O)-O^-$ while the conjugate base of acetic acid is $H-CH_2-C(=O)-O^-$ Both conjugate base has two resonating structure.





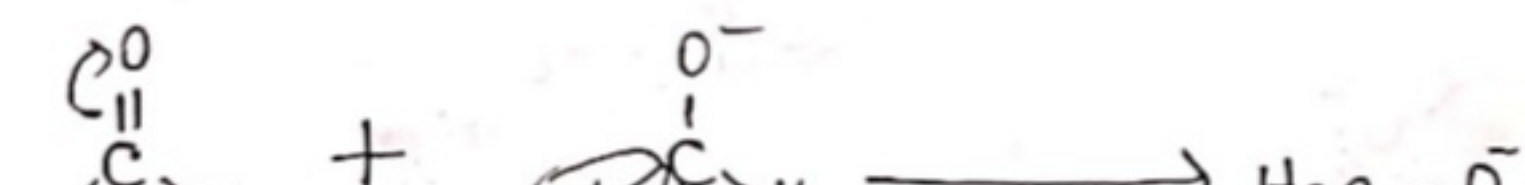
In conjugate base of chloroacetic acid negative charge is more delocalised due to $-I$ effect of Cl.

Thus conjugate base of chloro acetic acid is more stable. Therefore, chloroacetic acid is stronger acid than acetic acid.

d. Formaldehyde undergoes disproportiona -tion reaction when it is treated with conc. KOH.

Ans. Formaldehyde has no α-Hydrogen which when treated with conc. KOH disproportionate to give methyl alcohol and potassium formate.

This is an example of Cannizzaro reaction.



Mechanism

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