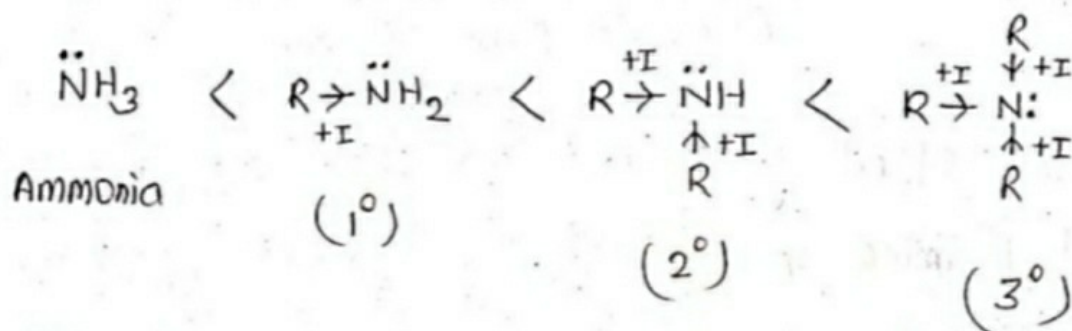


AMINES AND UREA 1.

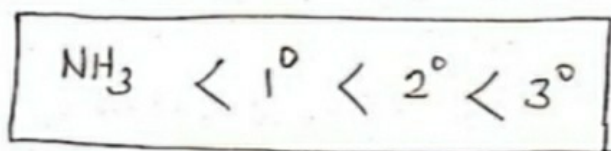
30/06/2021 Lecture-4 Deg-I Hons.

BASIC STRENGTH OF 1°, 2°, 3° AMINES AND AMMONIA

IN GASEOUS PHASE



With increase in no. of alkyl group attached to nitrogen, the electron density increases. hence, the basic strength is in following order.

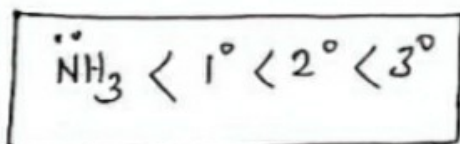


IN AQUEOUS SOLUTION

The basic strength of amine is subtle interplay of the following three effect:--

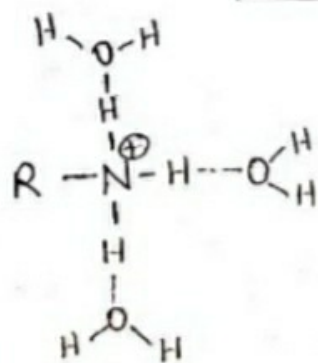
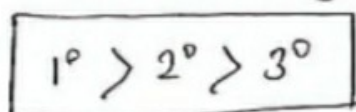
1. Inductive effect
2. Solvation effect
3. Steric effect

On the basis of inductive effect, the order should 2.

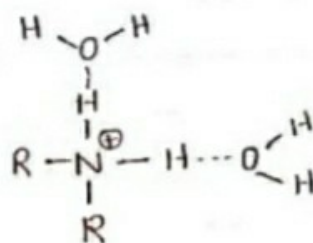


But in an aqueous solution the conjugate acid of 1° amine is more stable than that of 2° and conjugate acid of 2° amine is more stable than that of 3° due to solvation effect.

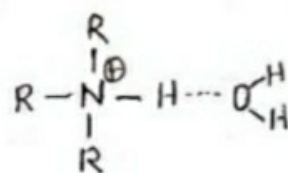
Therefore, Basic strength should be: -



Conjugate acid of
 1° amine



Conjugate acid of
 2° amine.



Conjugate acid
of 3° amine.

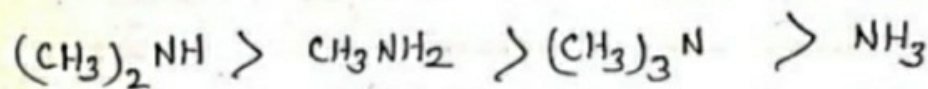
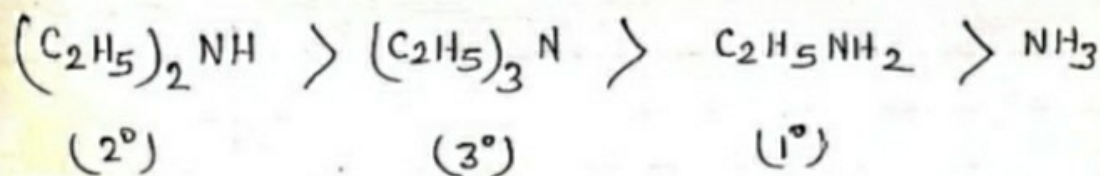
More the H_2O molecule attached, more stable will be conjugate acid.

* Size of alkyl group decide steric effect.

* When the alkyl group is small like $-\text{CH}_3$, there is no steric effects.

* In case of bigger alkyl group there is steric hindrance due to H-bonding. So conclusively the order of basic strength is subtle interplay

of these effect. The order of basic strength in case of methyl substituted amines and ethyl substituted amines in aqueous solution is as follows....



Completed.