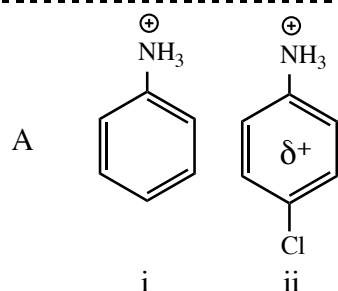


Chapter 23 Amines

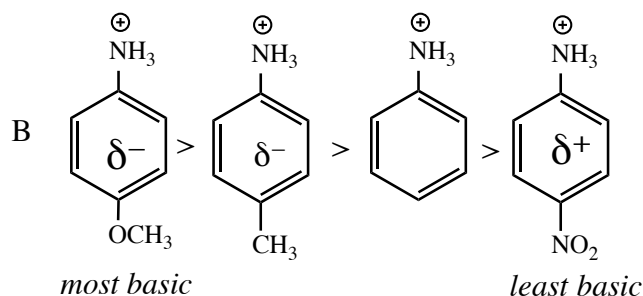
Solutions

1 A. 2° B. 3° C. 1° D. 1° E. 2° F. 3°

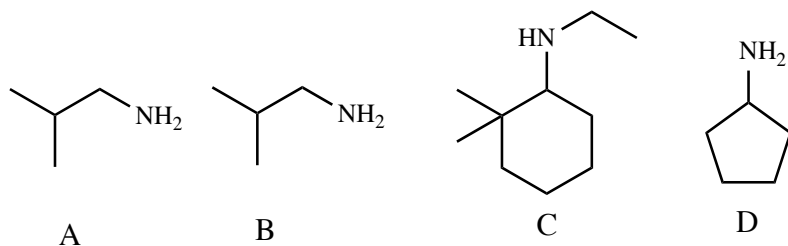


- Protonation of aniline leads to conjugate acid i while protonation of p-chloroaniline leads to conjugate acid ii
- Because Cl is an electron withdrawing group, it places some partial positive charge into the aromatic ring
- the presence of this partial positive charge destabilizes the positive charge on the nitrogen and makes ii LESS stable than i, and therefore more difficult to form
- therefore, p-chloroaniline will be a weaker base relative to aniline because its conjugate acid is less stable

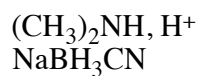
2



- electron-donor groups (OCH₃ and CH₃) place partial negative charge into the aromatic ring which stabilizes the conjugate acid's positive charge relative to that of unsubstituted aniline
- increased stability of the conjugate acid makes it easier to form and therefore the anilines substituted with electron donors are more basic than aniline itself
- OCH₃ is a stronger electron donor than CH₃ and therefore its partial negative charge is larger and more stabilizing
- the electron-withdrawing NO₂ group destabilizes the conjugate acid and makes it the weakest base



3



E



F