

TDC-II

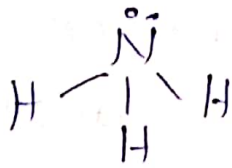
P-III

Non aqueous solvent

Liquid NH₃

- Q. Discuss the acid-base behaviour of salt in liquid NH₃ and Give Three Examples of neutralization Reaction
- Q. Compare water & liquid NH₃ as Solvent

NH₃



Trigonal pyramidal
sp³ hybridization

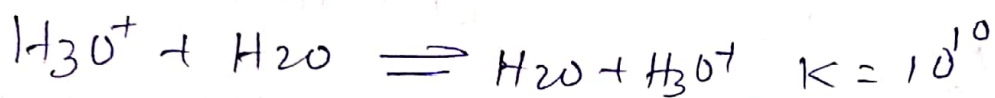
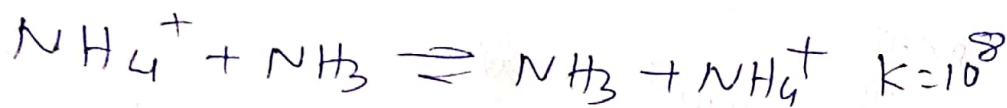
→ The Dielectric constant of liquid NH₃ (22) is less than ^{that of} liquid H₂O solvent (80)

— The ionic mobility of H₃O⁺ & OH⁻ in aqueous medium is very high which is explained through H-bonded network of solvent.

— But the ionic mobility of NH₄⁺ & NH₂⁻ in liquid NH₃ is normal as compared to other ions. It indicates that better & stronger H-bonding network in water.

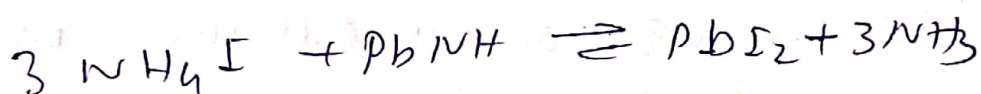
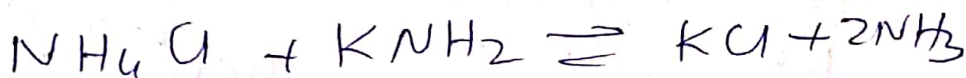
— Higher boiling point of H₂O (100°C) than liquid NH₃ (-33°C) shows less stronger H-bond in NH₃ (l)

— The Dipole moment of H₂O is higher than ^{that of} NH₃ (1.84 > 1.46)



✓ Acid-Base Neutralization Reactions

All ammonium salts are acidic in liquid NH_3 while NH_2^- , NH^- , N^{3-} are basic according to the concept of Solvent System defining acids & bases



→ In such reactions N^{3-} in liq. NH_3 is equivalent to O^{2-} in water

→ $\ominus\text{NH}_2$ & NH^- in liq. NH_3 are equivalent to hydroxide in water

✓ Amphoteric behaviours of Zn^{2+} & Al^{3+} salt in liq. NH_3 is also via acid-base rxn

