

Quiz 3
Fall 2003
Chem 311

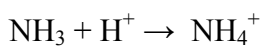
Name:

0.345 ml of concentrated HCl (12.1 M) is added to 100.00 ml of a 0.1025 M solution of ammonia. Calculate the pH of this solution.

$$K_a(\text{NH}_4^+) = 5.70 \times 10^{-10}$$

$$\text{Initial moles of NH}_3 = (0.1025 \text{ mmol/ml}) \times (100.00 \text{ ml}) = 10.25 \text{ mmol NH}_3$$

$$\text{Mol H}^+ \text{ added} = (0.345 \text{ ml}) \times (12.1 \text{ mmol/ml}) = 4.1745 \text{ mmol H}^+$$



At equilibrium

$$\text{Mol NH}_3 = 10.25 - 4.1745 = 6.0755 \text{ mmol}$$

$$\text{Mol NH}_4^+ = 4.1745 \text{ mmol}$$

Thus, this is a buffer!!!!

$$\text{pH} = -\log(k_a) + \log(6.0755/4.1745) = 9.244 + 0.162978 = 9.406978 = 9.407$$