

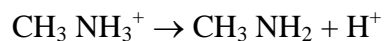
Problem 8-08 Charge numbers

What ratio of concentrations $c(\text{CH}_3\text{NH}_2) : c(\text{CH}_3\text{NH}_3^+)$ will be found, if you add a small amount of methylamine to the buffer solution with $\text{pH} = 10$? Acidity constant of methylammonia is $\text{p}K_a(\text{CH}_3\text{NH}_3^+) = 10.64$ (standard state: infinite dilution, $c^{\text{st}} = 1 \text{ mol dm}^{-3}$)

[$c(\text{CH}_3\text{NH}_2) : c(\text{CH}_3\text{NH}_3^+) = 0.229$; $\text{pH} < \text{p}K$, the share of protonated form is greater]

Řešení:

$$\text{pH} = 10 \Rightarrow c(\text{H}^+) = 10^{-10}$$



$$K_a = \frac{c(\text{CH}_3\text{NH}_2) \cdot c(\text{H}^+)}{c(\text{CH}_3\text{NH}_3^+)} = 10^{-10.64}$$

$$\frac{c(\text{CH}_3\text{NH}_2)}{c(\text{CH}_3\text{NH}_3^+)} = \frac{K_a}{c(\text{H}^+)} = \frac{10^{-10.64}}{10^{-10}} = 0.229$$