

zadanie 2.

Do 500 cm^3 $0,01$ molowego roztworu amoniaku dodano

a) $12,5 \text{ cm}^3$

b) 8 cm^3

$0,4$ molowego roztworu kwasu solnego.

Jak zmieni się pH roztworu?

$$pK_b \text{NH}_3 \cdot \text{H}_2\text{O} = 4,8$$

$$2) V = 500 \text{ cm}^3$$

$$C = 0,01 \text{ mol/dm}^3$$

$$pK_b = 4,8$$

$$pK_a = 9,2$$

$$pOH = \frac{1}{2} pK_b - \frac{1}{2} \log C$$

$$pOH = 2,4 + 1 = 3,4$$

$$pH = 3,6$$

a) HCl

$$V = 12,5 \text{ cm}^3$$

$$C_{HCl} = 0,4 \text{ mol/dm}^3$$

$$pH = ?$$

$\text{NH}_3 \cdot \text{H}_2\text{O}$

$$V = 500 \text{ cm}^3$$

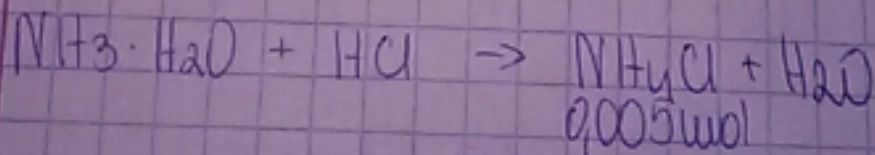
$$C = 0,01 \text{ mol/dm}^3$$

$$pK_b = 4,8$$

$$pH = 3,6$$

$$n_{\text{NH}_3 \cdot \text{H}_2\text{O}} = 0,5 \text{ dm}^3 \cdot 0,01 \text{ mol/dm}^3 = 0,005 \text{ mol}$$

$$n_{\text{HCl}} = 0,0125 \text{ dm}^3 \cdot 0,4 \text{ mol/dm}^3 = 0,005 \text{ mol}$$



$$C_{HCl} = \frac{0,005 \text{ mol}}{0,5125 \text{ dm}^3} = 9,46 \cdot 10^{-3}$$

~~$$9,99 \cdot 10^{-4}$$~~

$$pH = \frac{1}{2} pK_a - \frac{1}{2} \log C$$

$$pH = 4,6 + 1 = 5,6$$

b). HCl

$$V = 8 \text{ cm}^3 = 0,008 \text{ dm}^3$$

$$C_{HCl} = 0,4 \text{ mol/dm}^3$$

$$n_{HCl} = 0,0032 \text{ mol}$$

$$n_3 = 0,0032 \text{ mol}$$

$$C_3 = 0,0063 \text{ mol/dm}^3$$

$\text{NH}_3 \cdot \text{H}_2\text{O}$

$$n = 0,005 \text{ mol}$$

$$V = 500 \text{ cm}^3 = 0,5 \text{ dm}^3$$

$$pK_a = 9,2$$

$$V_3 = 0,508 \text{ dm}^3$$

$$pH = 4,6 + 1,1 = 5,7$$