zadanie 2.

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

a). 12,5 cm^3

b) 8 cm^3

0,4 molowego roztworu kwasu solnego.

Jak zmieni się pH roztworu?

$pK_b\ NH_3 \cdot H_2O = 4,8$

② $V = 500\ cm^3$

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

$pK_b = 4{,}8$ $\quad pK_a = 9{,}2$

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

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

$pH = 3{,}6$

---

a) HCl

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

$C_M = 0{,}4\ mol/dm^3$

$pH = ?$

$NH_3 \cdot H_2O$

$V = 500\ cm^3$

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

$pK_b = 4{,}8$

$pH = 3{,}6$

$n_{NH_3 \cdot H_2O} = 0{,}5\ dm \cdot 0{,}01\ mol/dm^3 = 0{,}005\ mol$

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

$NH_3 \cdot H_2O + HCl \rightarrow NH_4Cl + H_2O$

$0{,}005\ mol$

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

~~$9,98 \cdot 10^{-4}$~~

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

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

b). HCl $NH_3 \cdot H_2O$

$V = 8 cm^3 = 0,008 dm^3$ $n = 0,005 mol$

$C_M = 0,4 \ mol/dm^3$ $V = 500 cm^3 \cdot 0,5 dm^3$

$n_{HCl} = 0,0032 \ mol$ $pKa = 9,2$

$n_3 = 0,0032 \ mol$ $V_3 = 0,508 \ dm^3$

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

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