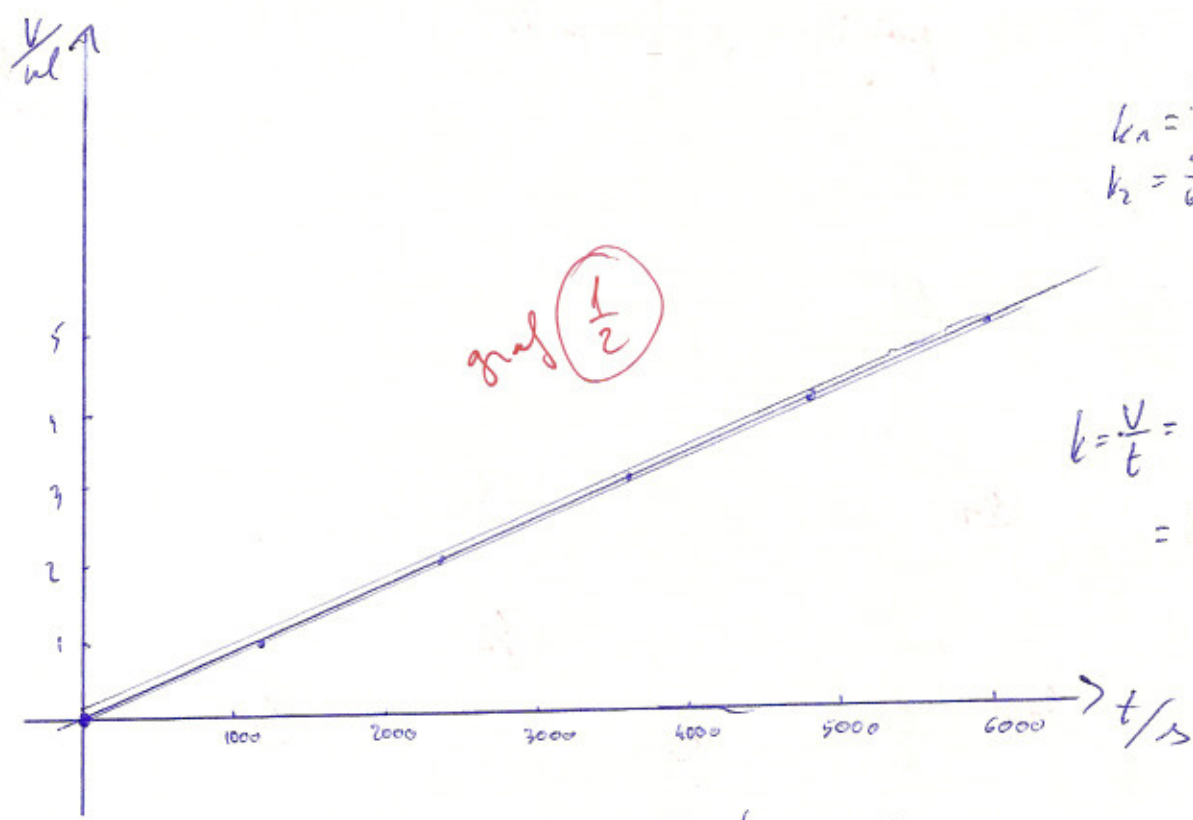


1

a)



$$k_1 = \frac{49}{6000} = 816 \cdot 10^{-4}$$

$$k_2 = \frac{52}{6000} = 866 \cdot 10^{-4}$$

ml = cm³

$$k = \frac{V}{t} = \frac{505 \text{ ml}}{6000 \text{ s}} = 8417 \cdot 10^{-4} \frac{\text{ml}}{\text{s}}$$

$$c = \frac{C_{\text{NaOH}} \cdot \bar{V}_{\text{NaOH}}}{20 \text{ ml}} = \frac{0.03378 \text{ mol} \cdot 20.31 \text{ ml}}{20 \text{ ml}} = 0.0132 \text{ M}$$

$$t_+ = \frac{cI}{k} = \frac{0.0132 \text{ mol} \cdot 96487 \text{ A}}{8417 \cdot 10^{-4} \frac{\text{ml}}{\text{s}}} = 0.8229$$

$$t_- = 0.1771$$

$$\bar{V}_{\text{NaOH}} = 20.31 \text{ ml}$$

$$\bar{dV}_{\text{NaOH}} = 0.7 \text{ ml}$$

$$\frac{dt_+}{t_+} = \frac{dc}{c} + \frac{dI}{I} + \frac{dk}{k} = \frac{d\bar{V}_{\text{NaOH}}}{\bar{V}_{\text{NaOH}}} + \frac{dV_{\text{NaOH}}}{V_{\text{NaOH}}} + \frac{dI}{I} + \frac{dk}{k}$$

$$= \frac{0.7 \text{ ml}}{20.31 \text{ ml}} + \frac{0.05 \text{ ml}}{20 \text{ ml}} + \frac{0.015 \cdot 20 \text{ A}}{10 \text{ A}} + \frac{0.24}{842} = 0.0354$$

$$dt_+ = 0.08 = dt_-$$

$$\frac{dt_-}{t_-} = 0.5$$

$$t_+ = 0.82(1 \pm 0.0354)$$

$$t_- = 0.18(1 \pm 0.5)$$

$$b) u_+ = \frac{\chi}{I} k = \frac{0.03314 \cdot 8417 \cdot 10^{-4} \frac{\text{cm}^2}{\text{s}}}{20 \text{ cm} \cdot 0.004 \text{ A}} = 3.294 \cdot 10^{-3} \frac{\text{cm}^2}{\text{Vs}}$$

$$\chi = \frac{l}{S \cdot R} = \frac{l}{a^2 R} = \frac{0.2 \text{ cm}}{0.5 \text{ cm}^2 \cdot 2044 \Omega} = 0.03914 \text{ cm}^{-1} \Omega^{-1}$$

$$u_+ = (3.3 \pm 0.15) \cdot 10^{-3} \frac{\text{cm}^2}{\text{Vs}}$$

$$\frac{du_+}{u_+} = \frac{d\chi}{\chi} + \frac{dI}{I} + \frac{dk}{k} = \frac{dl}{l} + 2 \frac{da}{a} + \frac{dR}{R} + \frac{dI}{I} + \frac{dk}{k} \approx 0.15$$

$$du_+ = 0.5 \cdot 10^{-3} \frac{\text{cm}^2}{\text{Vs}}$$

2) a) $\Delta T_2 = +0.73 K$ *parište grafično* (1/2)

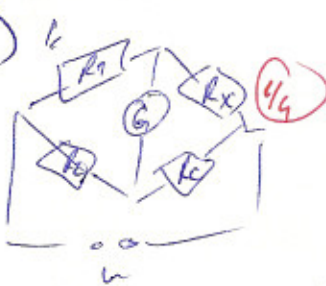
$$M_2 = \frac{m_2 K_2}{\rho \cdot V \Delta T} = \frac{1.14196 g \cdot 18608 K}{0.9982 g/ml \cdot 20 ml \cdot 0.73 K} = 145.75 g/ml$$

$$\frac{\Delta M_2}{M_2} = \frac{\Delta m_2}{m_2} + \frac{\Delta V}{V} + \frac{\Delta \Delta T}{\Delta T} = \frac{0.001 g}{1.14196 g} + \frac{0.02 ml}{20 ml} + \frac{0.03 K}{0.73 K} = 0.042$$

$$\Delta M_2 = 6.26 \approx 6 g/ml$$

$$M_2 = (146 \pm 6) g/ml = 146 (1 \pm 0.04) g/ml$$

b) *merjenje uže oprema* (1/4)



$$\frac{R_1}{R_2} = \frac{R_x}{R_c}$$

koef je (1/4)

3) a) $\phi_v = \phi_{v0} + k \sqrt{m}$ $\frac{d\phi_v}{d\sqrt{m}} = k = \frac{\phi_v - \phi_{v0}}{\sqrt{m}} = \frac{19.127 \frac{ml}{ml} - 16.4 \frac{ml}{ml}}{\sqrt{16} \text{ mol kg}^{-1/2}}$

$u_2 = 386 \cdot 10^{-7} m = 0.4954$

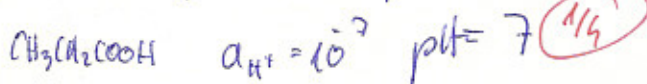
$$\phi_v = 16.4 \frac{ml}{ml} + 2.152 \frac{ml \text{ kg}^{1/2}}{ml^{3/2} \cdot M_2 \rho \cdot V} \sqrt{m}$$

$$= 16.4 \frac{ml}{ml} + 2.152 \frac{ml \text{ kg}^{1/2}}{ml^{3/2}} \sqrt{\frac{0.5764 g \cdot ml}{58.443 g/mol \cdot 20 ml}} = 17.91 \frac{ml}{ml}$$

$$V = V_1 + u_2 \cdot \phi_v = 20 ml + \frac{0.5764 g \cdot ml}{58.443 g} \cdot 17.91 \frac{ml}{ml} = 20.18 ml$$

b) $q_1 - q_2 = k(t_1^2 - t_2^2)$ *smiselna razlaga*

4) a) HCl $a_{H^+} = 0.02$ $pH = 1.7$ (1/4)



$$E_1 = E' - 2.303 \frac{RT}{F} pH_1$$

$$E_2 = E' - 2.303 \frac{RT}{F} pH_2$$

$$\Delta E = E_1 - E_2 = 2.303 \frac{RT}{F} (pH_2 - pH_1)$$

b) $E = E_0^{\ominus} + \frac{RT}{F} \ln a_{H^+} - E_{REF} + E_{dig}$ (1/2)

$$E \approx E' - 2.303 \frac{RT}{F} pH$$

$E' = E_0^{\ominus} - E_{REF} + E_{dig}$ *to določimo pri amajarji* (1/2)
koef je E_{dig} = f(a_{H⁺}) je pripravljeno, da je čim bližje (1/2)