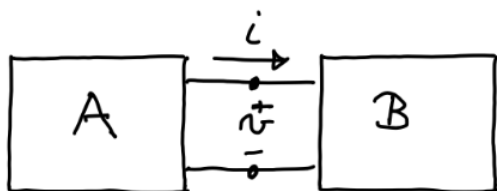


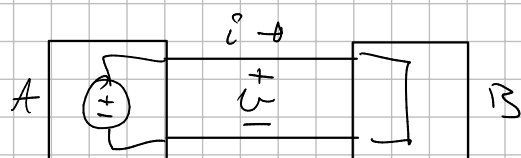
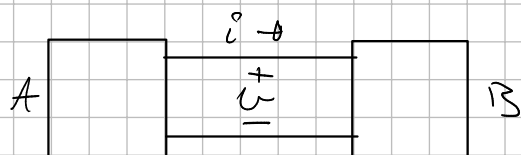
ERT 14

04/13 1)

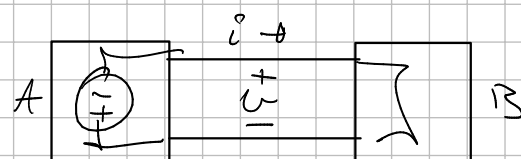


$$U = -5V$$

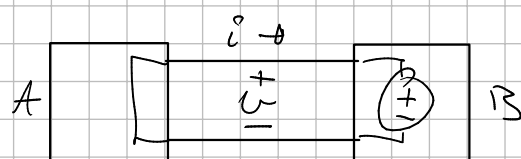
$$i = 20mA$$



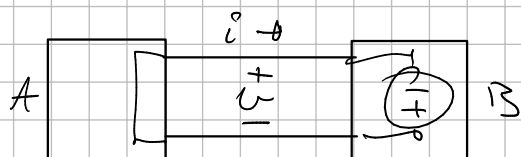
Strom +
Spannung +



Strom -
Spannung -

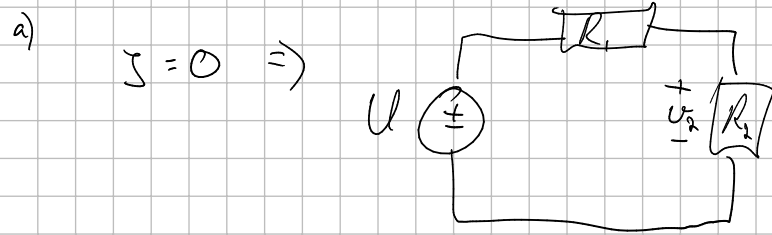
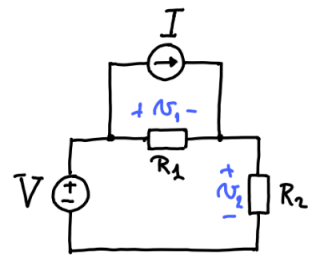


Strom -
Spannung +



Strom +
Spannung -

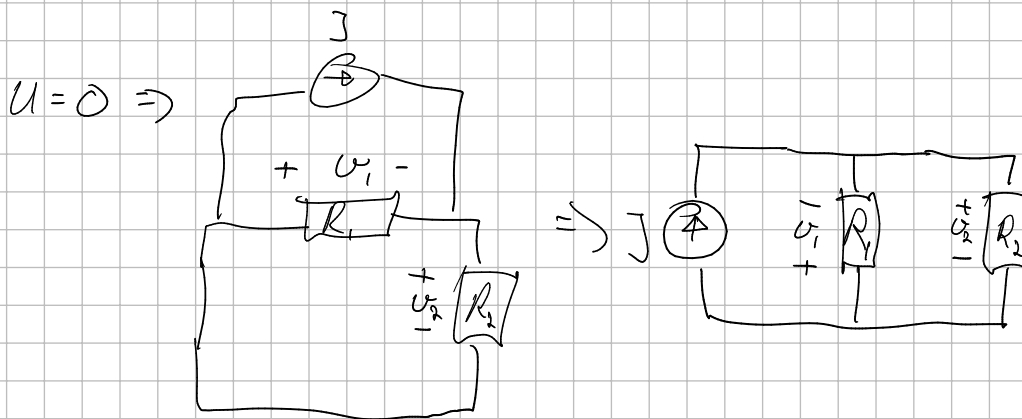
Opptg 2) $U = 5 \text{ V}$ $I = 5 \text{ mA}$
 $R_1 = 1 \text{ k}\Omega$ $R_2 = 2 \text{ k}\Omega$



$$U + U_1 + U_2 = 0$$

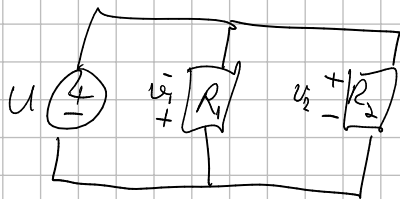
$$U_1 = U \frac{R_1}{R_1 + R_2} = 5 \cdot \frac{1}{3} = \frac{5}{3} \text{ V}$$

$$U_2 = U \frac{R_2}{R_1 + R_2} = 5 \cdot \frac{2}{3} = \frac{10}{3} \text{ V}$$



$$R_T = \left(\frac{1}{R_1} + \frac{1}{R_2} \right)^{-1} = \frac{R_1 R_2}{R_1 + R_2} = \frac{1 \text{ k}\Omega \cdot 2 \text{ k}\Omega}{3 \text{ k}\Omega} = \frac{2 \text{ k}^2 \Omega^2}{3 \text{ k}\Omega} = \frac{2}{3} \text{ k}\Omega$$

$$U = I R_T = 1 \text{ mA} \cdot \frac{2}{3} \text{ k}\Omega = 1 \cdot 10^{-3} \cdot \frac{2}{3} \cdot 10^3 = \frac{2}{3} \text{ V}$$



$$I = \frac{U}{R_1} + \frac{U}{R_2} = \frac{\frac{2}{3}}{1} + \frac{\frac{2}{3}}{2} = \frac{2}{3} + \frac{2}{6} = \frac{4}{3} \text{ mA}$$

$$U = -U_1 = U_2$$

$$U_1 = -\frac{2}{3} \text{ V}$$

$$U_2 = \frac{2}{3} \text{ V}$$

$$U_1 = \frac{5}{3} V + \left(-\frac{2}{3}\right) V = 1 V$$

$$U_2 = \frac{10}{3} V + \frac{2}{3} V = 4 V$$

$$i_1 = \frac{R_2}{R_1 + R_2} \quad -U_1 = i_1 R_1$$

$$= \left(1 \text{ mA} \cdot \frac{2 \text{ k}\Omega}{3 \text{ k}\Omega}\right) \cdot 1 \text{ k}\Omega$$

$$= \frac{2}{3} V$$

$$U_1 = -\frac{2}{3} V$$

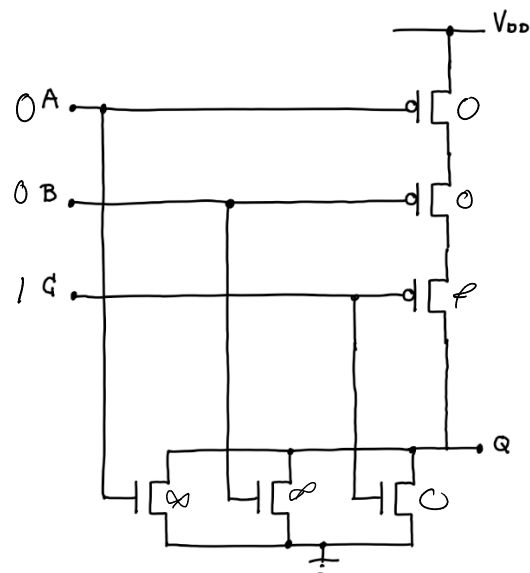
$$i_2 = \frac{R_1}{R_1 + R_2} \quad U_2 = i_2 R_2$$

$$= \left(1 \text{ mA} \cdot \frac{1 \text{ k}\Omega}{3 \text{ k}\Omega}\right) \cdot 2 \text{ k}\Omega$$

$$= \frac{2}{3} V$$

Ques 3)

A	B	C	Q
0	0	0	1
0	1	0	0
0	1	1	0
1	0	0	0
1	1	0	0
1	1	1	0



Ques 4)

a)

x_1	x_0	y_2	y_1	y_0
0	0	1	1	1
0	1	1	1	0
1	0	1	0	1
1	1	1	0	1

b)

$$y_2 = \overline{x_1} x_0 + x_1 \overline{x_0} + x_1 x_0$$

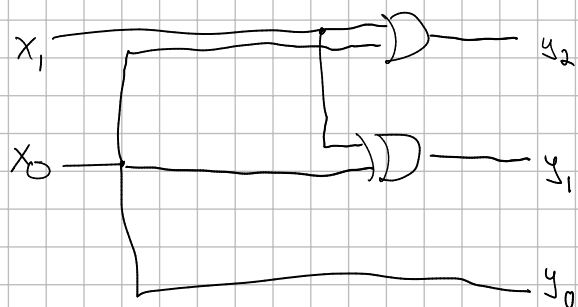
$$= x_1 + x_0$$

$$y_1 = \overline{x_1} x_0 + x_1 \overline{x_0}$$

$$y_0 = \overline{x_1} x_0 + x_1 x_0$$

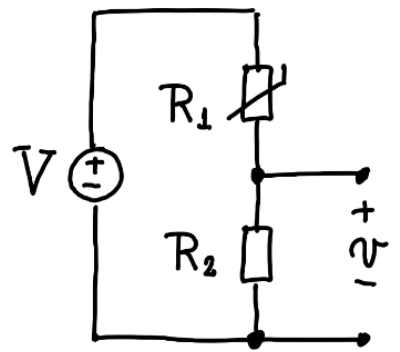
$$= x_0$$

c)



Übung 5) $R_T = R_0 - \alpha T$

a) $U(T) = U \frac{R_2}{R_1 + R_2} = U \frac{R_2}{R_2 + R_0 - \alpha T}$



c) $U = 9 \text{ V}$ $R_2 = 10 \text{ k}\Omega$ $R_0 = 20 \text{ k}\Omega$

$\alpha = 400 \Omega/^{\circ}\text{C}$ $T = 25^{\circ}\text{C}$ $k = 0,5 \text{ A h}$

$R_T = R_2 + R_1 = R_2 + (R_0 - \alpha T) = 10 \text{ k}\Omega + 20 \text{ k}\Omega - 400 \Omega \cdot 25$
 $= 20 \text{ k}\Omega$

$I = \frac{U}{R_T} = \frac{9 \text{ V}}{20 \text{ k}\Omega} = 0,45 \text{ mA}$

$k = 0,5 \text{ A h}$

$I \cdot t = 0,5$

$t = \frac{0,5}{0,45 \cdot 10^{-3} \text{ A}}$

$t = 1111 \text{ timer}$

Übung 6) $R_1 = 1 \Omega$ $U = 5 \text{ V}$ $R_2 = 8 \Omega$ $P = U I \Rightarrow \frac{U^2}{R}$

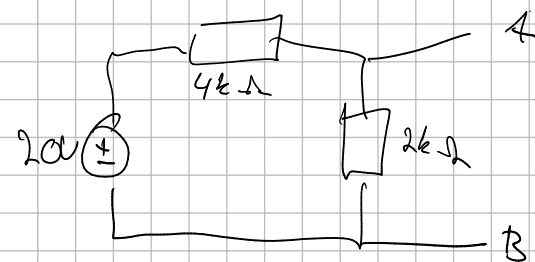


$U_h = U \frac{R_2}{R_1 + R_2} = 5 \text{ V} \cdot \frac{8}{9} = \frac{40}{9} \text{ V}$

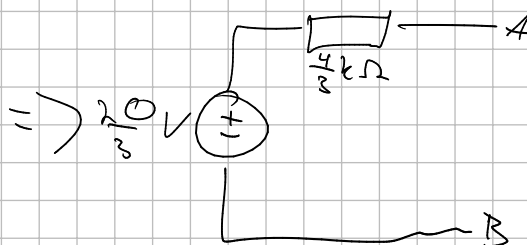
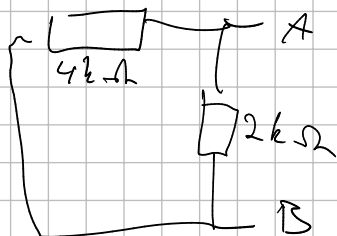
$P = \frac{U^2}{R} = \frac{\left(\frac{40}{9} \text{ V}\right)^2}{8 \Omega} = \frac{\left(\frac{1600}{81}\right)}{8} = \frac{200}{81} \text{ W} = 2,47 \text{ W}$

Oppt 1)

Thévenin 1



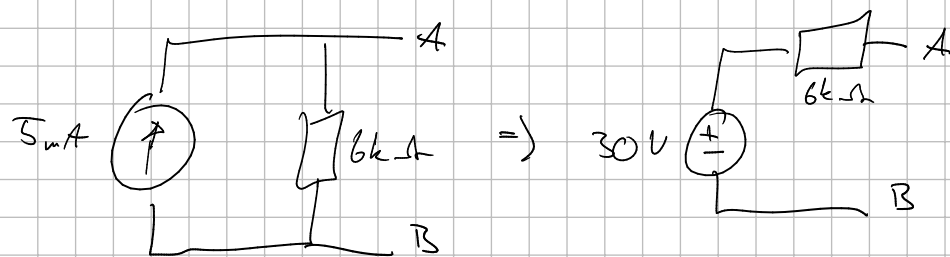
$U = 0$



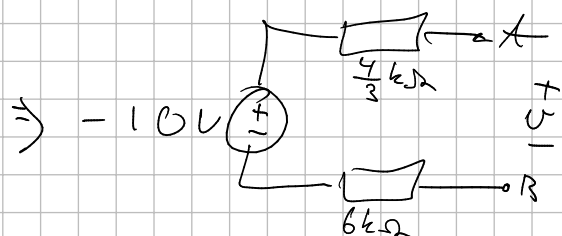
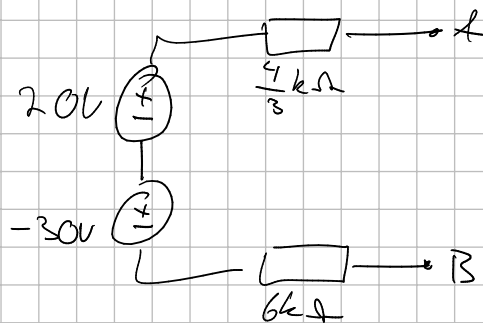
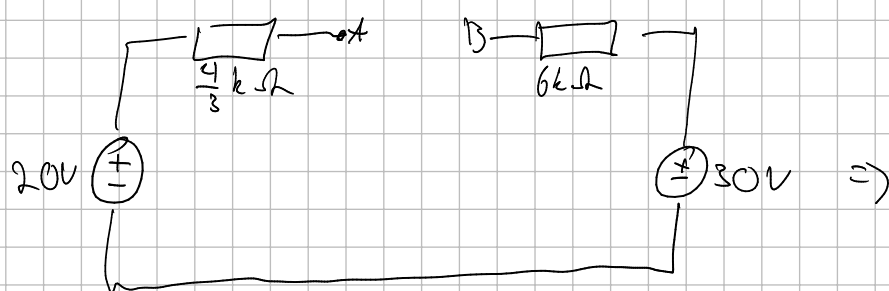
$$R_T = \frac{8 \text{ k}\Omega^2}{6 \text{ k}\Omega} = \underline{\underline{\frac{4}{3} \text{ k}\Omega}}$$

$$U_{th} = 20 \text{ V} \cdot \frac{2 \text{ k}\Omega}{6 \text{ k}\Omega} = \underline{\underline{\frac{20}{3} \text{ V}}}$$

Thévenin 2



$$U = 5 \text{ mA} \cdot 6 \text{ k}\Omega = 30 \text{ V}$$



$$R_{th} = \frac{4}{3} k\Omega + 6 k\Omega = \frac{4}{3} + \frac{18}{3} = \frac{22}{3} k\Omega$$

$$U_{AB} = -10V$$

