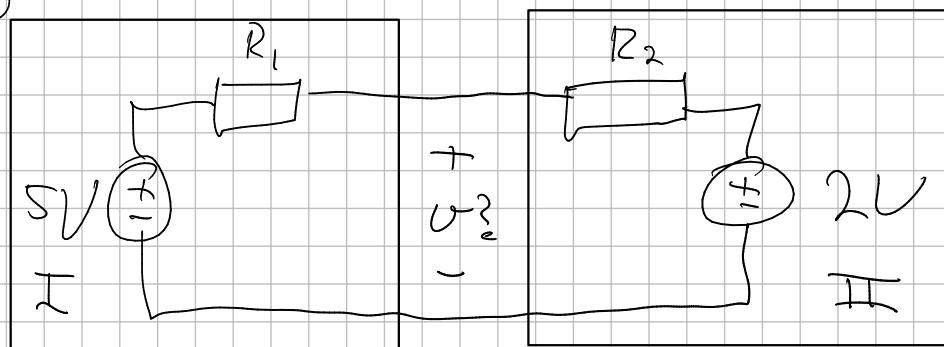
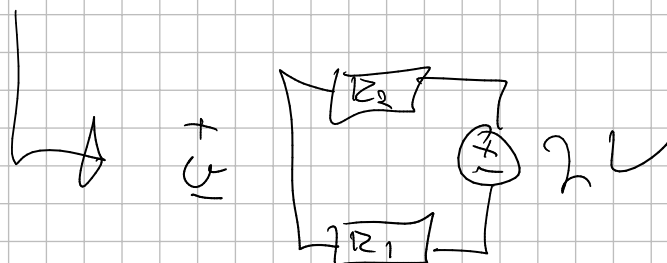
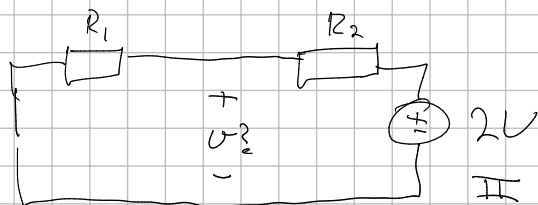


Opplg 2)



$$u_I = 0$$



$$U = 2 \text{ I } R_{\text{TOT}} (R_2 + R_1) \quad u_1 = -u \quad R_1 = 1000 \Omega$$

$$R_2 = 2000 \Omega$$

$$U = u_2 + u_1$$

$$u_1 = U - u_2$$

$$= \int R_1 - \int R_2$$

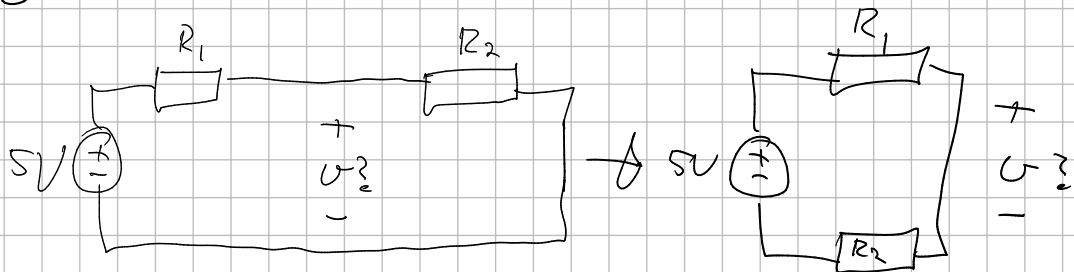
$$= \int (R_2 + R_1 - R_2) = \int R_1$$

$$= U \frac{R_1}{R_1 + R_2}$$

$$u_1 = 2 \cdot \frac{1}{3}$$

$$u_1 = \frac{2}{3}$$

$$U_H = 0$$



$$R_1 = 1 \text{ k}\Omega \quad R_2 = 2 \text{ k}\Omega$$

$$U = U_1 + U_2 \quad R_T = (R_1 + R_2) \quad U = R \cdot I \Rightarrow I = \frac{U}{R}$$

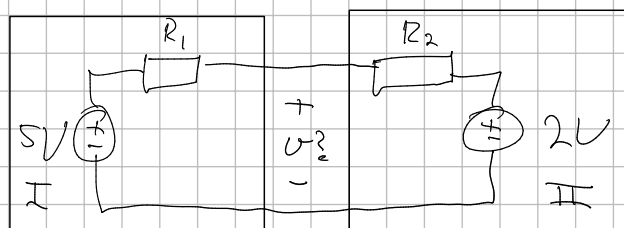
$$U_2 = U - U_1$$

$$U_2 = I R_2 - I R_1 \\ = I (R_2)$$

$$R_1 + R_2 - R_1 = R_2$$

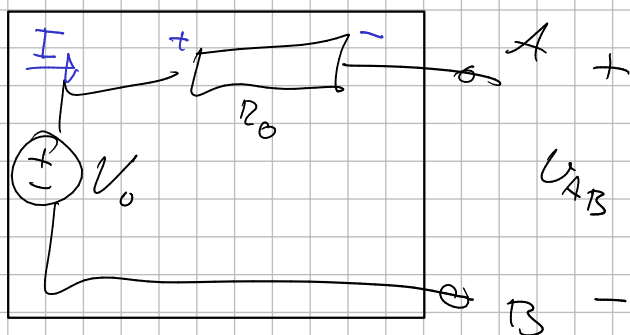
$$= U \frac{R_2}{R_1 + R_2}$$

$$U_2 = 5 \cdot \frac{2}{3} = \frac{10}{3} \text{ V}$$



$$U = \frac{10}{3} - \frac{2}{3} = \underline{\underline{\frac{8}{3} \text{ V}}}$$

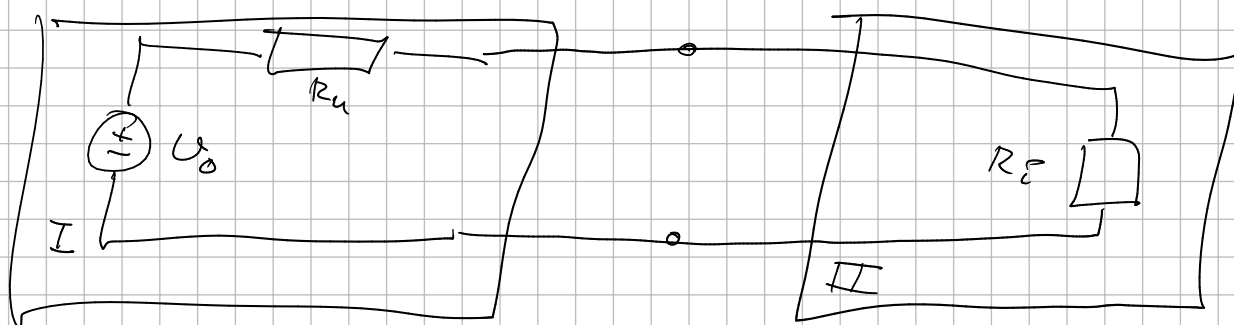
Oppg 3)



$$U_{AB} = -U_{R_0} + U_0$$

$$\underline{U_{AB} = -R_0 I + U_0}$$

Oppg 4)



$$R_i = 8 \Omega \quad U_0 = 10 \text{ V} \quad R_u = ? \Rightarrow U_{R_i} \neq 9 \text{ V}$$

$$U_{R_i} = 9 \text{ V}$$

$$U_0 = R_u I$$

$$I = \frac{U}{R}$$

$$U_0 = (R_u + R_i) I$$

$$= I R_u + I R_i$$

$$I R_u = U_0 - I R_i$$

$$I R_u = U_0 - U_{R_i}$$

$$\frac{U_{R_i}}{R_i} R_u = U_0 - U_{R_i}$$

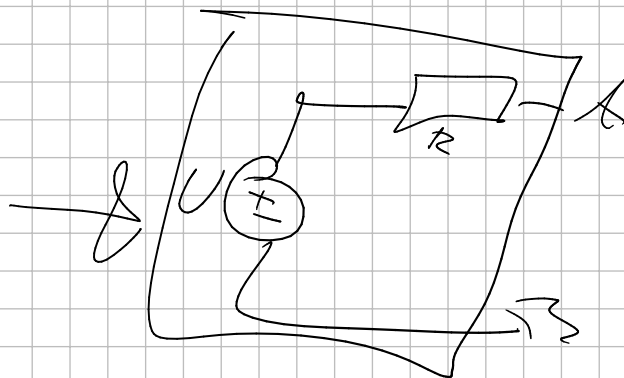
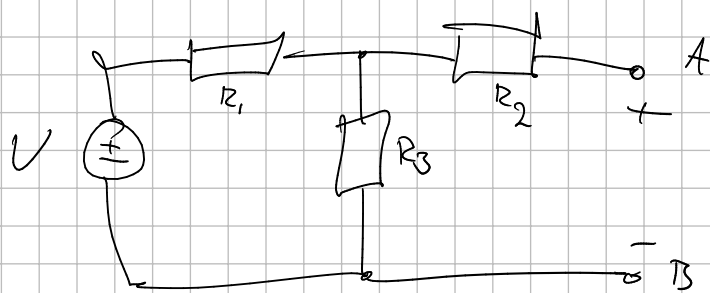
$$R_u = \frac{R_i}{U_{R_i}} (U_0 - U_{R_i})$$

$$= U_0 \frac{R_i}{U_{R_i}} - R_i = R_i \left( \frac{U_0}{U_{R_i}} - 1 \right)$$

$$R_u = 8 \left( \frac{10}{9} - 1 \right) = \underline{\underline{\frac{8}{9} \text{ V}}}$$

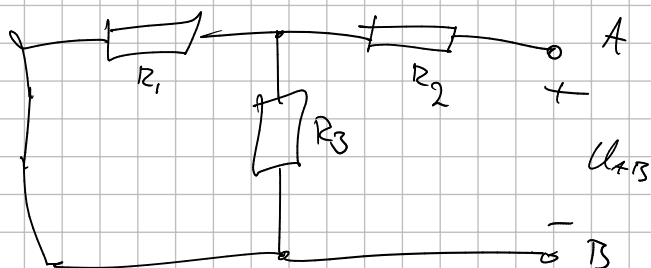
01/11/13 5)

a)



$$U_0 = U \frac{R_3}{R_1 + R_3} \quad \& \quad R_0 = \frac{R_1 R_2 + R_1 R_3 + R_2 R_3}{R_1 + R_3}$$

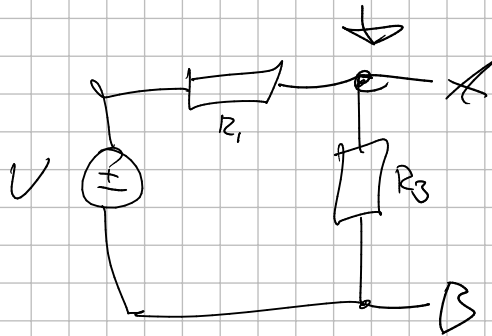
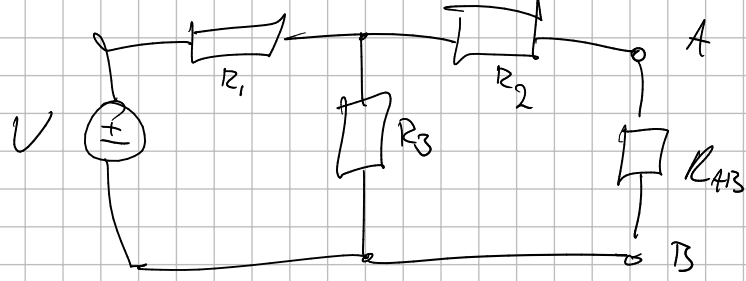
$$U = 0 \Rightarrow$$



$$R_T = R_2 + \left( \frac{1}{R_1} + \frac{1}{R_3} \right)^{-1} = R_2 + \left( \frac{R_1 + R_3}{R_1 R_3} \right)^{-1} = R_2 + \frac{R_1 R_3}{R_1 + R_3} = \frac{R_2 (R_1 + R_3) + R_1 R_3}{R_1 + R_3}$$

$$R_0 = \frac{R_1 R_2 + R_2 R_3 + R_1 R_3}{R_1 + R_3}$$

$$R_{AB} = \infty \Rightarrow$$



$$R_T = R_1 + R_3 \quad U = R I$$

$$U = U_1 + U_3$$

$$U_3 = U - U_1$$

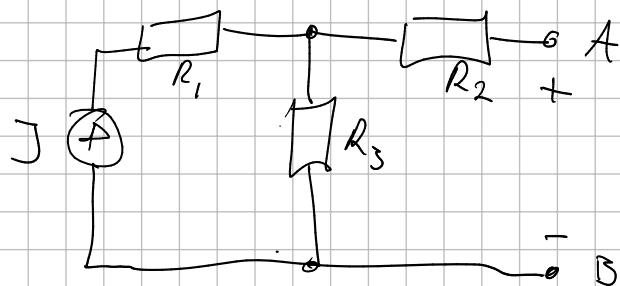
$$U_3 = I R_T - I R_1$$

$$U_3 = I R_3$$

$$U_3 = U \frac{R_3}{R_T}$$

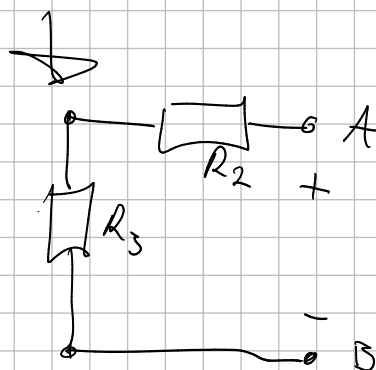
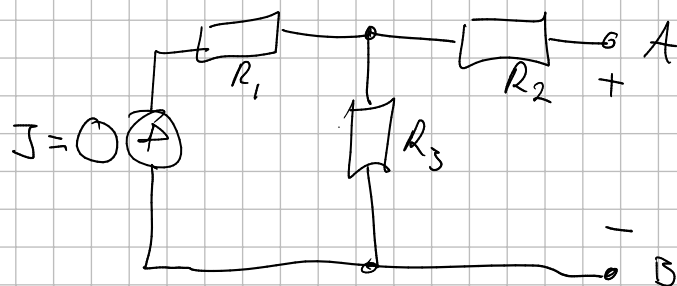
$$U_3 = U \frac{R_3}{R_1 + R_3}$$

6)



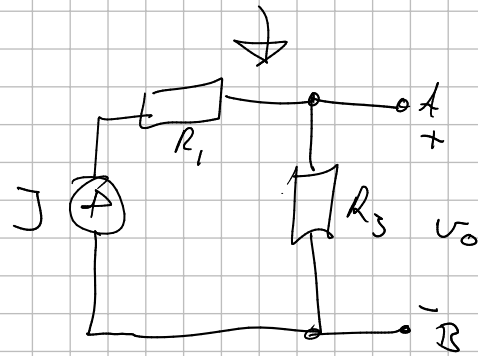
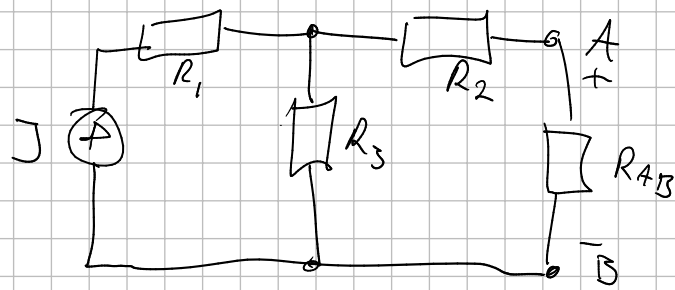
$$U_0 = J R_3 \quad R_0 = R_2 + R_3$$

$$J = 0$$



$$\underline{R_0 = R_2 + R_3}$$

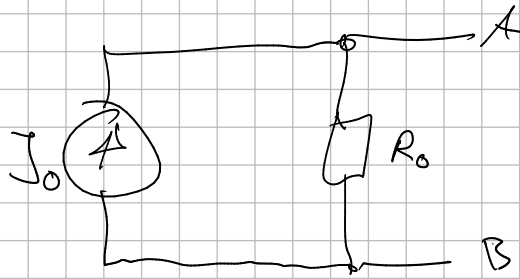
$$R_{AB} = \infty$$



$$U = R J$$

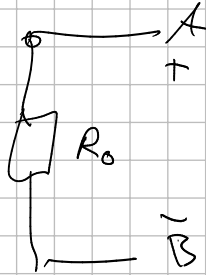
$$\underline{\underline{U_0 = J R_3}}$$

Oppg 6)

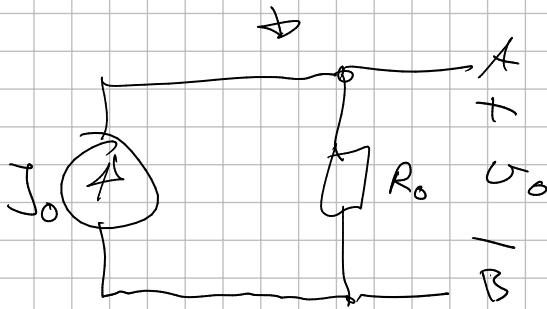
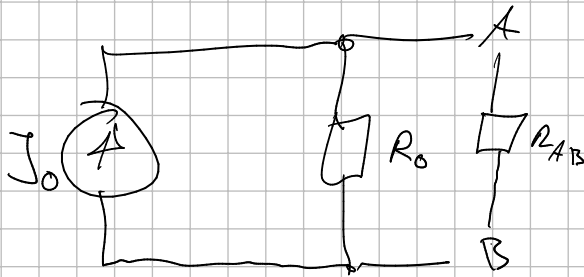


$$J_0 = 0$$

$$R_0 = R_0$$



$$R_{AB} = \infty$$



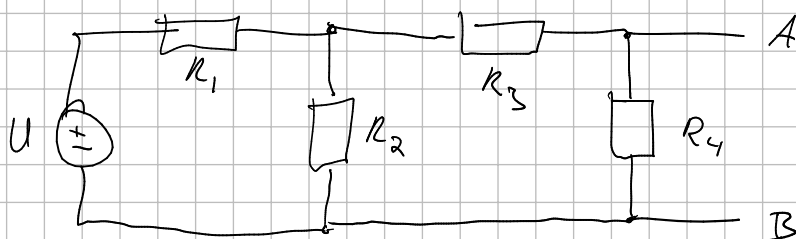
$$U = R J$$

$$\underline{\underline{U_0 = R_0 J_0}}$$

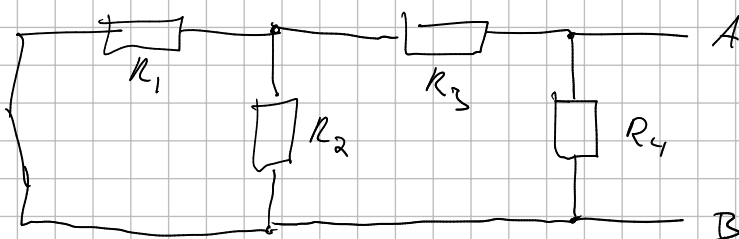


Opplg 8)

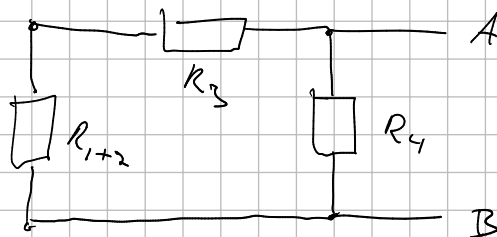
a)



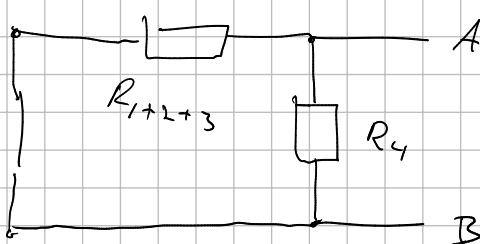
$$U = 0$$



$$R_{1+2} = \frac{R_1 R_2}{R_1 + R_2} = \frac{1 \text{ k}\Omega \cdot 2 \text{ k}\Omega}{3 \text{ k}\Omega} = \frac{2}{3} \text{ k}\Omega$$

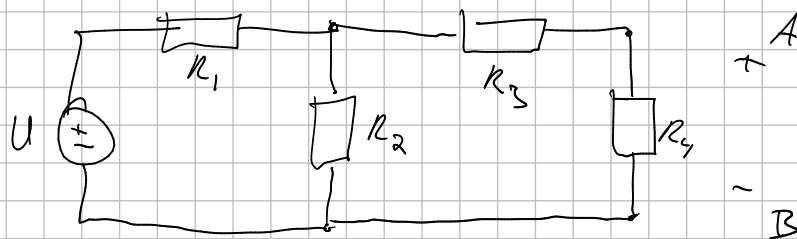


$$R_{1+2+3} = R_{1+2} + R_3 = \frac{2}{3} \text{ k}\Omega + 3 \text{ k}\Omega = \frac{11}{3} \text{ k}\Omega$$



$$R_0 = \frac{R_{1+2+3} R_4}{R_{1+2+3} + R_4} = \frac{\frac{11}{3} \text{ k}\Omega \cdot 4 \text{ k}\Omega}{\frac{11}{3} \text{ k}\Omega + 4 \text{ k}\Omega} = \frac{\frac{44}{3} \text{ k}\Omega}{\frac{23}{3} \text{ k}\Omega} = \underline{\underline{\frac{44}{23} \text{ k}\Omega}}$$

$$R_{A+B} = \infty$$



$$U_0 = U_{R_4}$$

$$R_T = R_1 + \left( \frac{1}{R_2} + \frac{1}{R_3 + R_4} \right)^{-1} = R_1 + \left( \frac{R_2 + R_3 + R_4}{R_2(R_3 + R_4)} \right)^{-1} = R_1 + \frac{R_2(R_3 + R_4)}{R_2 + R_3 + R_4}$$

$$= \frac{R_1 R_2 + R_1 R_3 + R_1 R_4 + R_2 R_3 + R_2 R_4}{R_2 + R_3 + R_4}$$

$$U = I \cdot R_T$$

$$U = I \cdot \frac{R_1 R_2 + R_1 R_3 + R_1 R_4 + R_2 R_3 + R_2 R_4}{R_2 + R_3 + R_4}$$

$$U(R_2 + R_3 + R_4) = I(R_1 R_2 + R_1 R_3 + R_1 R_4 + R_2 R_3 + R_2 R_4)$$

$$U R_2 + U R_3 + U R_4 = I R_1 R_2 + I R_1 R_3 + I R_1 R_4 + I R_2 R_3 + I R_2 R_4$$

