

1-45

Från lösning till 1-24 b):

$$\begin{cases} -\left(\frac{1}{R} + \frac{1}{R_1} + \frac{1}{R_2}\right) \cdot V_0 + \frac{1}{R} \cdot V_1 = \frac{-E}{R_1} \\ \frac{1}{R} \cdot V_0 - \left(\frac{1}{R} + \frac{1}{R_3} + \frac{1}{R_4}\right) \cdot V_1 = \frac{-E}{R_3} \end{cases}$$

Med värden insatta:

$$\begin{cases} -\left(\frac{1}{100} + \frac{1}{2.5k} + \frac{1}{0.5k}\right) \cdot V_0 + \frac{1}{100} \cdot V_1 = \frac{-10}{2.5k} \\ \frac{1}{100} \cdot V_0 - \left(\frac{1}{100} + \frac{1}{1.05k} + \frac{1}{0.2k}\right) \cdot V_1 = \frac{-10}{1.05k} \end{cases} \Rightarrow$$

$$\begin{cases} -\frac{31}{2.5k} \cdot V_0 + \frac{25}{2.5k} \cdot V_1 = \frac{-10}{2.5k} & \Leftrightarrow -31 \cdot V_0 + 25 \cdot V_1 = -10 \quad (1) \\ \frac{10.5}{1.05k} \cdot V_0 - \frac{16.75}{1.05k} \cdot V_1 = \frac{-10}{1.05k} & \Leftrightarrow 10.5 \cdot V_0 - 16.75 \cdot V_1 = -10 \quad (2) \end{cases}$$

$$(2) \Rightarrow V_0 = \frac{16.75 \cdot V_1 - 10}{10.5} (*)$$

(*) insatt i (1) ger:

$$-31 \cdot \left(\frac{16.75 \cdot V_1 - 10}{10.5}\right) + 25 \cdot V_1 = -10 \Leftrightarrow$$

$$\frac{25 \cdot 42 - 2077 \cdot V_1}{42} = \frac{-210 - 620}{21} = \frac{-830}{21} \Leftrightarrow V_1 = \frac{-830 \cdot 42}{21 \cdot 1027} = \frac{830 \cdot 2}{1027}$$

$$(*) \Rightarrow V_0 = \frac{16.75 \cdot \left(\frac{830 \cdot 2}{1027}\right) - 10}{10.5} = \frac{\left(\frac{67 \cdot 415}{4 \cdot 1027} - 10\right) \cdot 2}{13.79 \cdot 21} = \frac{17535 \cdot 2}{13.79 \cdot 21} = \frac{2 \cdot 3 \cdot 5 \cdot 7 \cdot 167}{13.79 \cdot 21} = \frac{1670}{1027}$$

$$I = \frac{V_0 - V_1}{R} = \frac{1670 - 1660}{1027} = \frac{1}{1027} \approx 97,4 \mu A$$

$$100 \Rightarrow \text{utslag} = I / 0,5 \mu \approx \underline{\underline{195 \text{ mm}}}$$