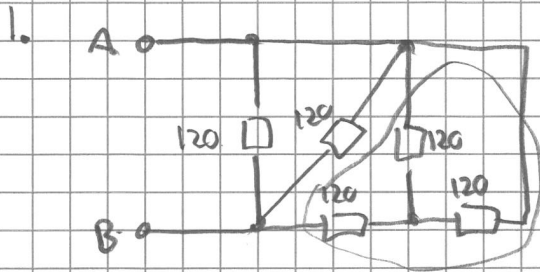
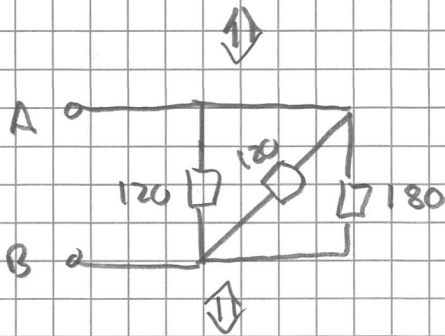


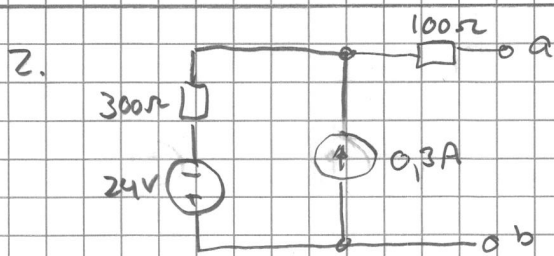
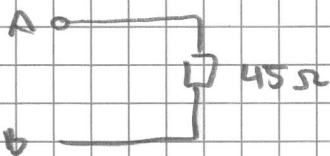
[Ω]



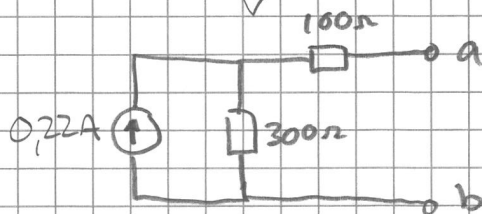
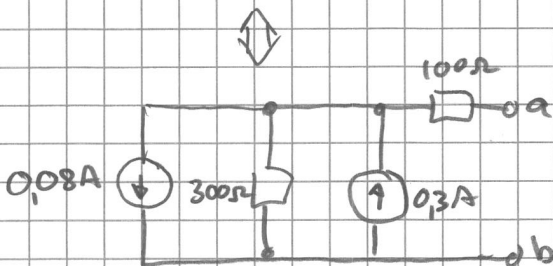
$$120 + 120 // 120 = 180 \Omega$$



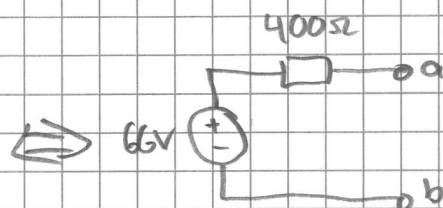
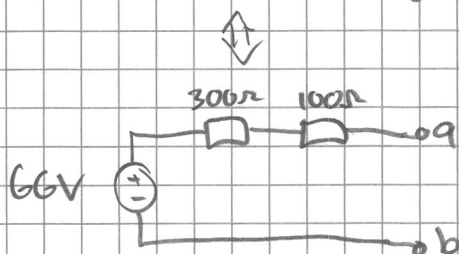
$$120 // 120 // 180 = \frac{1}{\frac{1}{120} + \frac{1}{120} + \frac{1}{180}} = 45 \Omega$$



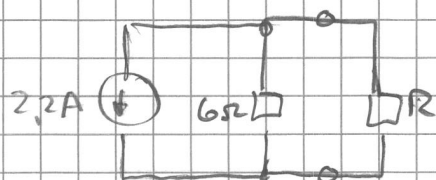
$$\frac{24V}{300\Omega} = 0,08A$$



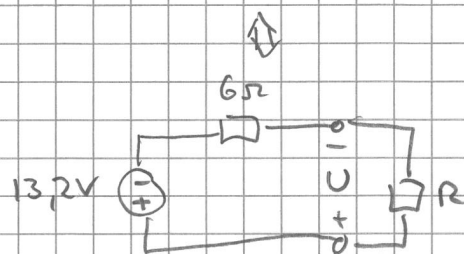
$$0,22A \cdot 300\Omega = 66V$$



3



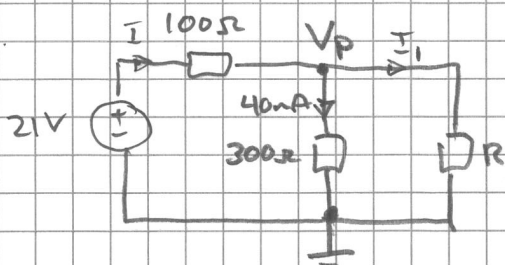
$$2,2\text{A} \cdot 6\Omega = 13,2\text{V}$$



Max effekt da $R = 6\Omega$ da ar $U = \frac{13,2}{2} \text{ V}$

$$\text{Max effekt } \underline{\underline{P}} = \frac{U^2}{R} = \frac{\left(\frac{13,2}{2}\right)^2}{6} = \underline{\underline{7,26\text{W}}}$$

4



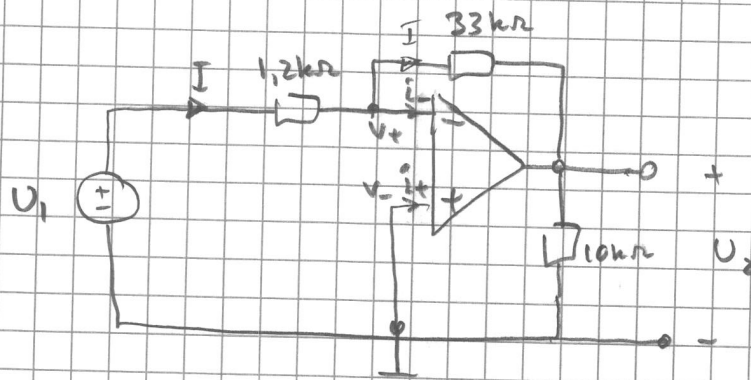
$$\underline{\underline{V_p}} = 0 + 40\text{mA} \cdot 300\Omega = \underline{\underline{12\text{V}}}$$

$$I = \frac{21\text{V} - V_p}{100\Omega} = \frac{21 - 12}{100} = 90\text{mA}$$

$$\underline{\underline{\text{KI}}} \quad I_1 = I - 40\text{mA} = (90 - 40)\text{mA} = \underline{\underline{50\text{mA}}}$$

$$\underline{\underline{R}} = \frac{V_p}{I_1} = \frac{12\text{V}}{0,050\text{A}} = \underline{\underline{240\Omega}}$$

5]



$$I = 0,24 \text{ mA}$$

Ideal OP $\Rightarrow \hat{U}_+ = \hat{U}_- = 0$

— " — neg återkopplad $\Rightarrow V_- = V_+$

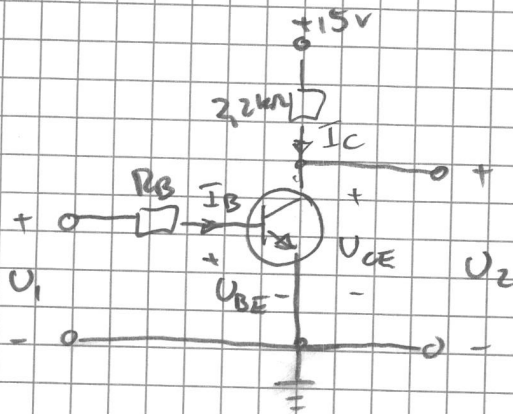
I f3 $V_+ = 0 \text{ V} \Rightarrow V_- = 0 \text{ V}$

KU: $U_1 - 1,2 \text{ k}\Omega \cdot I - \underbrace{V_+}_0 = 0 \Rightarrow$

$U_1 = 1,2 \text{ k}\Omega \cdot I = 1,2 \text{ k}\Omega \cdot 0,24 \text{ mA} = 0,288 \text{ V}$

$U_2 = \underbrace{V_+}_0 - 33 \text{ k}\Omega \cdot I = -33 \text{ k}\Omega \cdot 0,24 \text{ mA} = -7,92 \text{ V}$

6.



$$\beta_{FE} = 200$$

$$U_{CEsat} = 0,1 \text{ V}$$

a) KU: $U_2 + 2,2 \text{ k}\Omega \cdot I_C - 15 \text{ V} = 0 \Rightarrow$

$$I_C = \frac{15 - U_2}{2,2 \text{ k}\Omega} = \frac{15 - 7,5}{2200} = 3,41 \text{ mA}$$

$$I_B = \frac{I_C}{\beta_{FE}} = \frac{3,41 \text{ mA}}{200} = 17 \text{ }\mu\text{A}$$

KU $U_1 - R_B I_B - U_{BE} = 0 \Rightarrow \underline{U_1 = R_B I_B + U_{BE} = 68 \text{ k}\Omega \cdot 17 \text{ }\mu\text{A} + 0,7 \text{ V} = 1,86 \text{ V}}$

G.1 b)

KU

$$U_{CEsat} + 2,2k\Omega \cdot I_C - 15V = 0$$

$$I_C = \frac{15 - U_{CEsat}}{2,2k\Omega} = \frac{15 - 0,1}{2200} = 6,77mA$$

$$\underline{I_B \geq \frac{I_C}{h_{FE}} = \frac{6,77mA}{200} = 33,9\mu A}$$

KU

$$U_1 - R_B I_B - U_{BE} = 0 \Rightarrow$$

$$R_B = \frac{U_1 - U_{BE}}{I_B} = \frac{5 - 0,7}{33,9 \cdot 10^{-6}} = 127k\Omega$$

$$\underline{\underline{R_B \leq 127k\Omega}}$$

for饱nnd transistor.