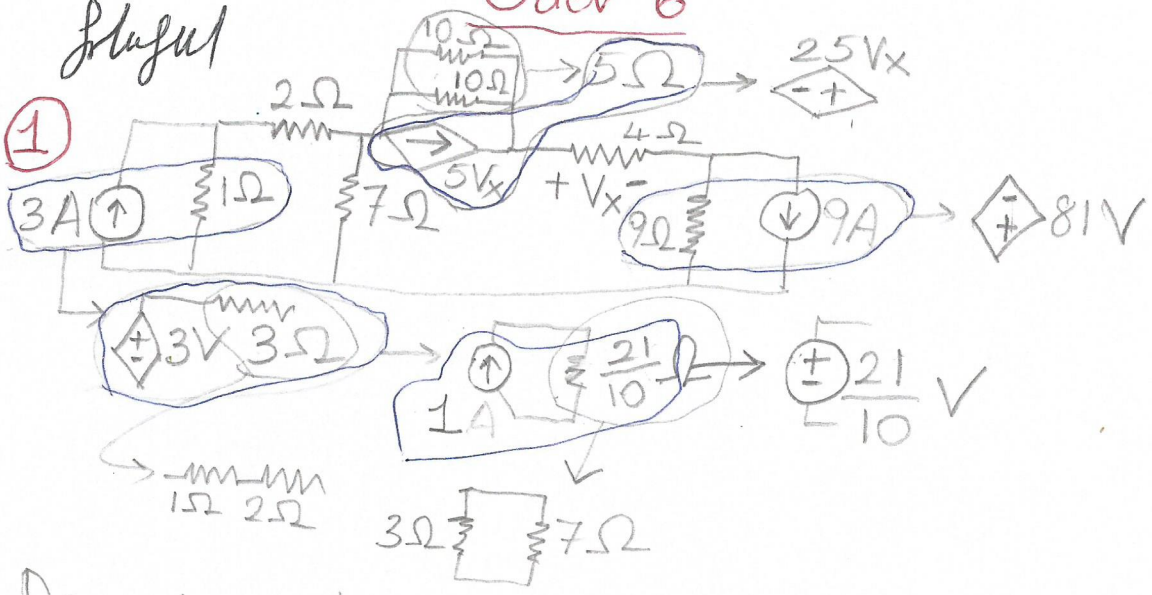
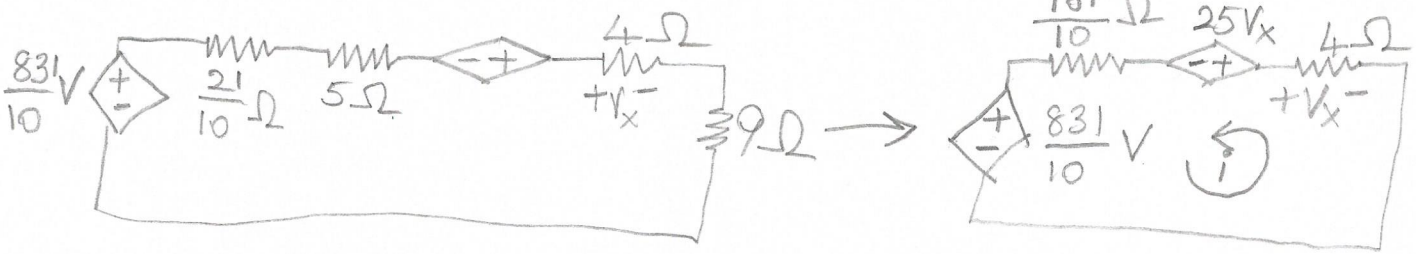
Ertuğrul KANTAR
0519000000086
Ertuğrul

Ödev 6

1



Devrenin son hali



→Ok yönünde mesh ile...

$$-V_x + 25V_x + \frac{161}{10}i + \frac{831}{10} = 0 \quad (I) \qquad V_x = -4i \quad (II)$$

(I) ve (II) den → $i = 1.04\,A$ | $V_x = -4.16\,V$ → a

→ $-104.(1,04) = -108,16\,W$ Güç sağlar. → b

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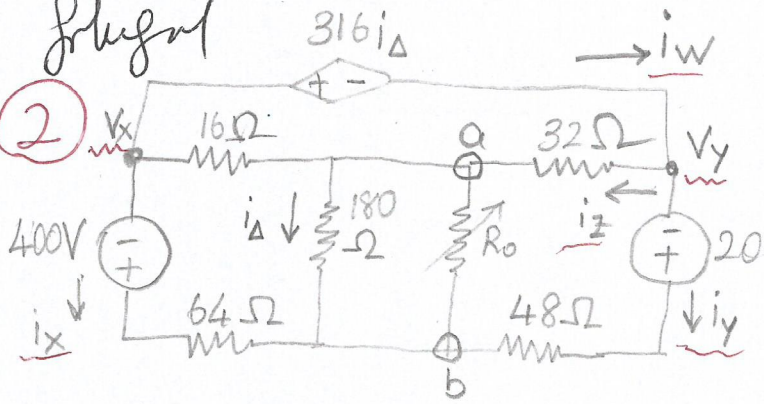
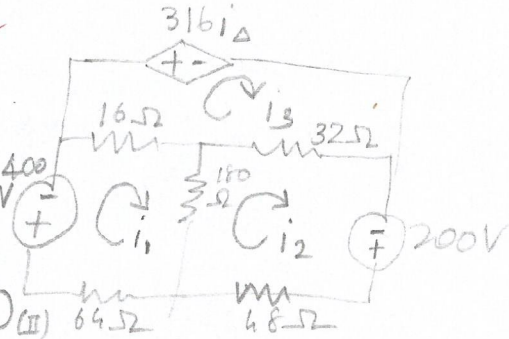
2) 

• Alt. çizimler C şıkkında kullanılacak

V_{oc} için ab açık devre yapılır.



$16(i_1-i_2)+180(i_1-i_3)+64i_1+400=0$ (I)

$-200+48i_2+180(i_2-i_1)+32(i_2-i_3)=0$ (II)

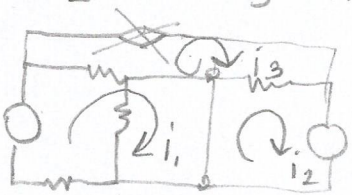
$i_\Delta = i_1 - i_2$ (III)

$32(i_3-i_2)+16(i_3-i_1)+316(i_1-i_2)=0$ (IV)

4 denklem çözülürse...

$i_1=3A$ $i_2=5A$ $i_3=17,5A$ $i_\Delta=-2A$ $V_{oc}=180,-2=-360V$ → 180Ω // V_{oc}

i_{sc} için



$i_\Delta=0$ → (316 i_Δ) V devreden çıkar.

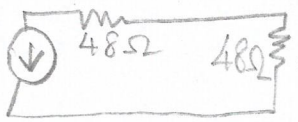
$64i_1+16(i_1-i_3)+400=0$ (I) $32(i_2-i_3)+48i_2-200=0$ (II)

$32(i_3-i_2)+16(i_3-i_1)=0$ (III)

(I) (II) (III) den → $i_1=-5A$ $i_2=2,5A$ $i_3=0$

$i_{sc}=i_1-i_2=-7,5A$ $\boxed{R_{Th}=R_o=\frac{-360}{-7,5}=48\Omega}$ → a

b) $\boxed{P_{MAX}=(3,75)^2 \cdot 48=675\ W}$



c-) R_o in üstünde -180 V var. $i_\Delta=-1A$ olur.

316 i_Δ

$\frac{V_x+400}{64}+\frac{V_x+180}{16}+\frac{V_y+200}{48}+\frac{V_y+180}{32}=0$ (I) $V_y-316=V_x$ (II)

(I) ve (II) den → $V_x=-336V$ $V_y=-20V$

$i_x=\frac{-336+400}{64}=1A$ $i_y=\frac{-20+200}{48}=3,75A$ $i_z=\frac{-20+180}{32}=5A$

$i_w=i_y+i_z=8,75A$

$P_{316i_A} = -316 \cdot 8{,}75 = -2765\ W$

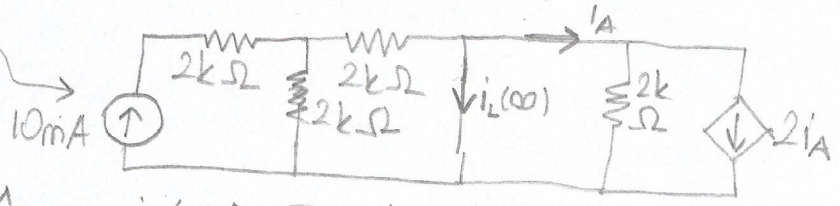
$P_{400V} = -400\ W \quad P_{200V} = -200 \cdot 3{,}75 = -750\ W$

$P_{üretilen} = -3915\ W \quad \% \rightarrow \frac{675}{3915} \cdot 100 = \boxed{\%17{,}2}$ c

3 $i(t) = i(\infty) + [i(0^+) - i(\infty)]\, e^{-t/\tau}$

$i_L(0^+) = 5\ mA\ (2k\Omega // 2k\Omega)$

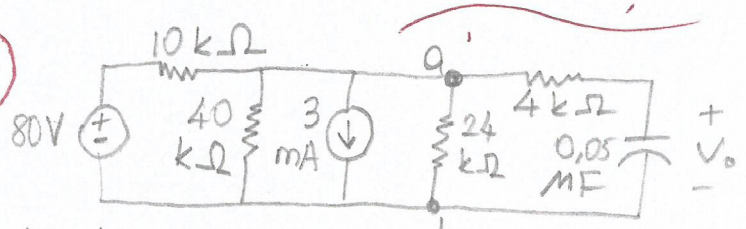
$i_L(\infty)$



$i_A = 0\ A \rightarrow i_L(\infty) = 5\ mA\ (2k\Omega // 2k\Omega)$

$i(t) = 5 + 0 \cdot e^{-t/\tau} = 5\ mA$

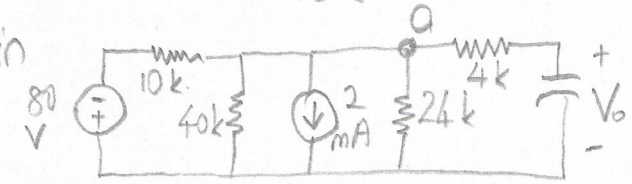
4



$t<0$ 'da $V_o(0^-) = V_a \rightarrow$ Kondansatör açık devre gibi davranır.

$\frac{V_a}{24k} + 3.10^{-3} + \frac{V_a}{40k} + \frac{V_a - 80}{10k} = 0 \rightarrow V_a(0^-) = 30V$

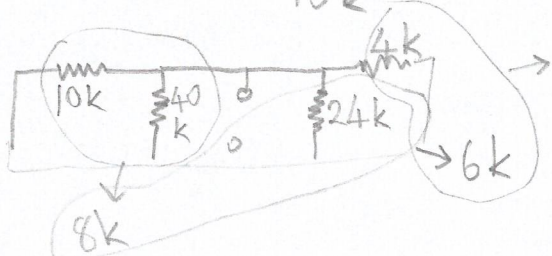
$t>0$ için



$V_o(\infty) = V_a$

$\frac{V_a}{24k} + \frac{V_a}{40k} + 2.10^{-3} + \frac{V_a + 80}{10k} = 0 \rightarrow V_o(\infty) = -60V$

$R_{TH} \rightarrow$



$\rightarrow 10k\Omega = R_{TH}$

$\tau = R.C = 10.10^3.(0{,}05).10^{-6}$

$\tau = \frac{1}{2000}\ s$

$V_o(t) = V_o(\infty) + [V_o(0^+) - V_o(\infty)]\, e^{-t/\tau}$

$V_o(t) = -60 + 90e^{-2000t}\ V$