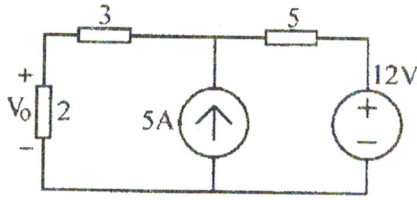


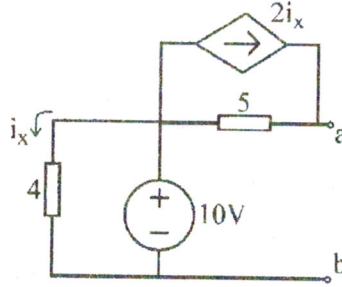
Bilgisayar Mühendisliği Bölümü
Devre Teorileri Dersi Final Soruları (Sınav Süresi 65 dk)

- 1) V_o gerilimini süperpozisyon teoremini kullanarak bulunuz.



30

- 2) ab noktasından bakıldığında görünen Thevenin eşdeğer devresini bulunuz.

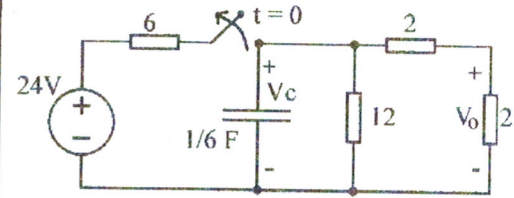


35

- 3) $t=0$ anında uzun süredir kapalı olan anahtar açılmaktadır.

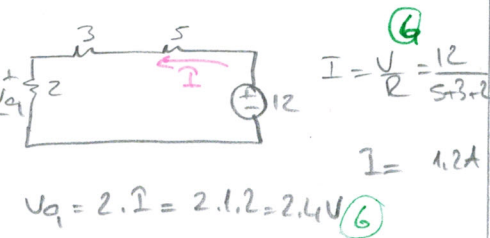
a) $V_c(t)$ gerilimini $t \geq 0$ için bulunuz.

b) $V_o(t)$ gerilimini $t \geq 0$ için bulunuz.



35

C-1) 1. kaynaklı aktif devre

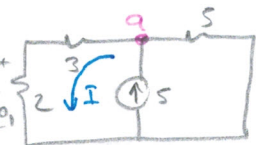


$$I = \frac{V}{R} = \frac{12}{5+3+2}$$

$$I = 1.2A$$

$$V_o = 2 \cdot I = 2 \cdot 1.2 = 2.4V$$

2. kaynaklı pasif devre



$$\frac{V_o}{2+3} + \frac{V_o}{5} - 5 = 0$$

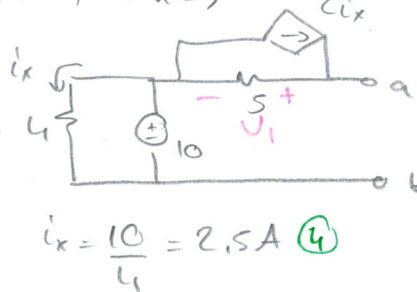
$$V_o = 25/2 V$$

$$I = \frac{V_o}{2+3} = \frac{25/2}{5} = 2.5A$$

$$V_o2 = 2 \cdot I = 2 \cdot 2.5 = 5V$$

$$V_o = V_o1 + V_o2 = 2.4 + 5 = 7.4V$$

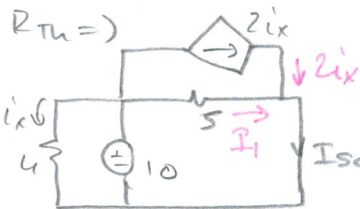
C-2) $V_{th} =$



$$i_x = \frac{10}{4} = 2.5A$$

$$V_1 = 2 \cdot i_x \cdot 5 = 2 \cdot 2.5 \cdot 5 = 25V$$

$$V_{th} = 10 + V_1 = 35V$$

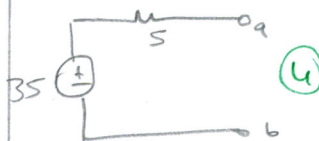


$$i_x = \frac{10}{4} = 2.5A$$

$$I_1 = \frac{10}{5} = 2A$$

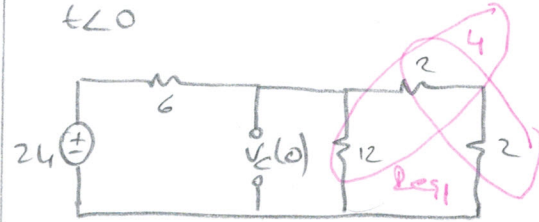
$$I_{sc} = I_1 + 2i_x = 2 + 5 = 7A$$

$$R_{th} = \frac{V_{th}}{I_{sc}} = \frac{35}{7} = 5\Omega$$



C-3)

$t < 0$



$$R_{eq} = (2+2) \parallel 12 = \frac{4 \cdot 12}{4+12} = 3\Omega$$

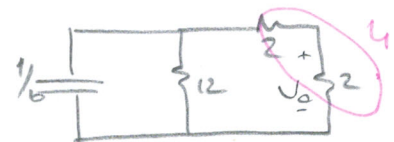
$$R_{eq} = 6 + R_{eq1} = 9\Omega$$

$$V_c(0) \Rightarrow \frac{24}{R_{eq}} = I$$

$$I = \frac{24}{9} = \frac{8}{3}A$$

$$V_c(0) = I \cdot R_{eq1} = \frac{8}{3} \cdot 3 = 8V$$

$t \geq 0$



$$R_{eq} = 4 \parallel 12 = 3\Omega$$

$$\tau = R \cdot C = 3 \cdot \frac{1}{6} = 0.5s$$

$$V_c(t) = V_c(0) e^{-t/\tau} = 8 e^{-2t}$$

$$V_o(t) = \frac{V_c(t)}{(2+2)}, 2 = \frac{8}{2} e^{-2t} = 4 e^{-2t}$$