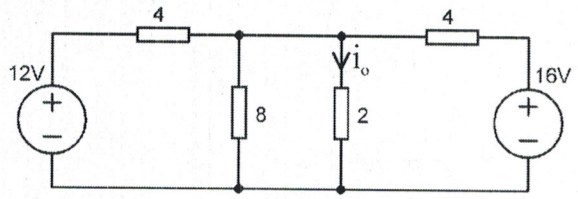
Adı Soyadı:
Öğrenci No:

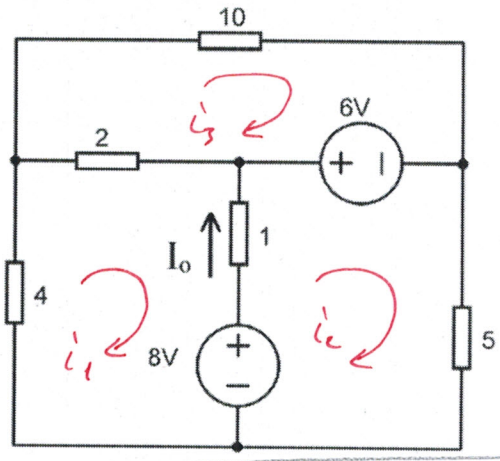
09.11.2018
11:00

Kütahya Dumlupınar Üniversitesi
Mühendislik Fakültesi-Bilgisayar Mühendisliği Bölümü
Devre Teorileri Dersi Arasınav Soruları
Sınav Süresi: 65 dk

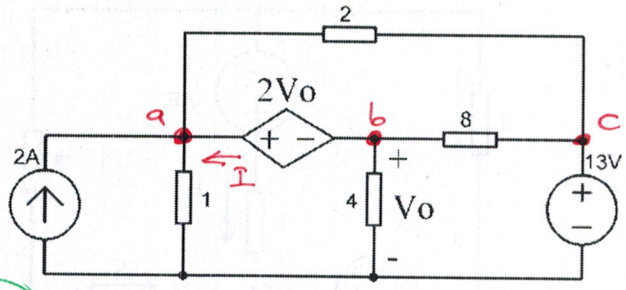
1) En az iki kaynak dönüşü yaparak i_o akımını istediğiniz bir yöntemle bulunuz



2) Io akımını göz (mesh) analizi yöntemi ile bulunuz. 1 ohm'luk direnç üzerinde harcanan gücü hesaplayınız.

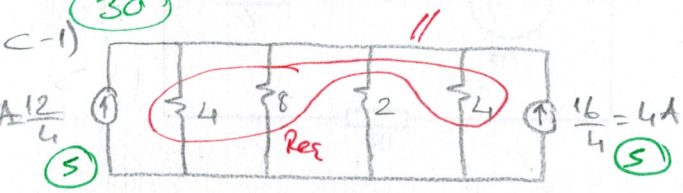


3) V_o gerilimini Düğüm analizi yöntemi ile bulunuz?



(30)

C-1)

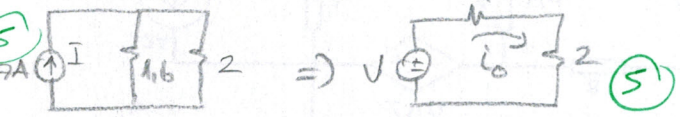


(5) (5)

$$Req = \left(\frac{1}{4}+\frac{1}{8}+\frac{1}{4}\right)^{-1} = \frac{5^{-1}}{8} = \frac{8}{5} = 1{,}6$$

(2) (2) (5)

$I = 3+4 = 7A$



(5) (5)

$V = 7 \cdot 1{,}6 = 11{,}2$

$$i_o = \frac{11{,}2}{(2+1{,}6)} = 3{,}11\ A$$ (5)

C-2) $4i_1 + 2(i_1-i_3)+1(i_1-i_2)+8=0$

$\Rightarrow 4i_1+2i_1-2i_3+i_1-i_2=-8$

$\Rightarrow 7i_1-i_2-2i_3=-8$ ---(1) (6)

$5i_2-8+1(i_2-i_1)+6=0$

$\Rightarrow 5i_2+i_2-i_1=2$

$6i_2-i_1=2$ ---(2) (6)

$10i_3+2(i_3-i_1)-6=0$

$\Rightarrow 10i_3+2i_3-2i_1=6$

$\Rightarrow -2i_1+12i_3=6$ (3) (6)

$i_o = i_2-i_1$ ---(4) (6)

(2)'den $\Rightarrow i_2 = \frac{2+i_1}{6}$

(1)'de (2)'yi yazarsak $\Rightarrow$

$7i_1-\left(\frac{2+i_1}{6}\right)-2i_3=-8$

$42i_1-2-i_1-12i_3=-48$

$41i_1-12i_3=-46$ ---(5) (6)

(5) ve (3) den $\rightarrow$

$-2i_1+12i_3=6$

$41i_1-12i_3=-46$

$39i_1=-40$

$i_1=-1{,}02\ A$

$i_2 = \frac{2+i_1}{6} = \frac{2-1{,}01}{6} = 0{,}16\ A$

(4)den $\Rightarrow i_o = i_2-i_1 = 0{,}16-(-1{,}02) = 1{,}18$

$P_{1\Omega} = I^2 \cdot R = i_o^2 \cdot 1 = (1{,}18)^2 \cdot 1 = 1{,}39\ W$ (5)

(-3) node a: $-2 + V_a + \frac{V_a - V_c}{2} - \cancel{I} = 0$

node b: $\frac{V_b}{4} + \frac{V_b - V_c}{8} + \cancel{I} = 0$

$8\left(\frac{3V_a}{2} - \frac{V_c}{2} + \frac{3V_b}{8} - \frac{V_c}{8} = 2\right)$

$\Rightarrow \quad 12V_a - 4V_c + 3V_b - V_c = 16$ (12)

$\Rightarrow \quad 12V_a + 3V_b - 5V_c = 16 \quad \cdots (1)$

node c: $V_c = 13\,V \quad \cdots (2)$ (6)

(3) $\cdots V_a = V_b$ (6)

$V_a - V_b = 2V_a \quad \cdots (4)$ (6)

$\Rightarrow V_a = 2V_a + V_b$

$= 2V_b + V_b$

$V_a = 3V_b \quad \cdots (5)$

(1), (2) ve (5) den (5)

$\Rightarrow$

$12.(3V_b) + 3V_b - 5.13 = 16$

$39V_b = 81$

$V_b = 2,07V$

$V_a = V_b = 2,07V$