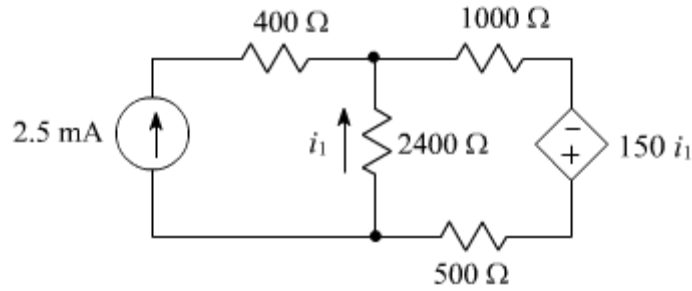


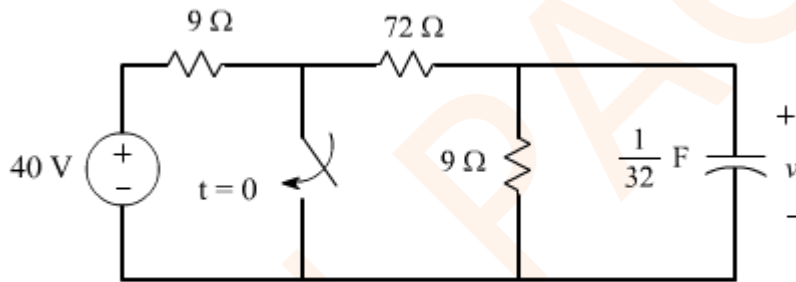
ELEKTRİK DEVRELERİ I FİNAL 2006 - 2007

SORU 1 -) Şekil 1 deki devrede i_1 akımını çevre akımları yöntemi ile bulunuz.



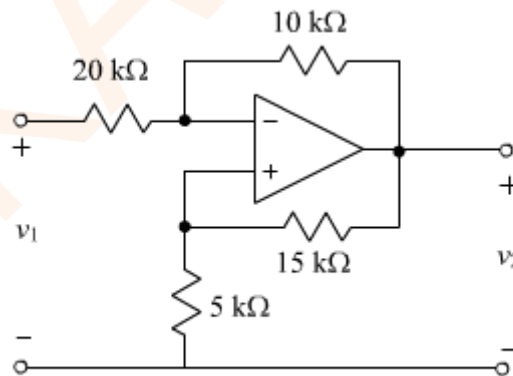
Şekil 1

SORU 2 -) Şekil 2 deki devre $t = 0^-$ da karalı haldedir. $t > 0$ için v gerilimini bulunuz.



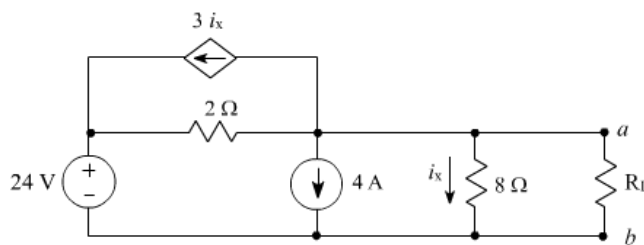
Şekil 2

SORU 3 -) Şekil 3 deki devrede v_2 / v_1 oranını bulunuz.



Şekil 3

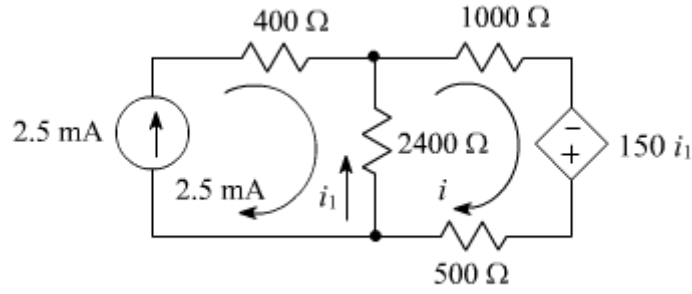
SORU 4 -) Şekil 4 deki devrede R_L nin harcadığı maksimum gücü bulunuz.



Şekil 4

ÇÖZÜMLER

ÇÖZÜM 1 -)



Şekil 1

$$i_1 = i - 2.5 \times 10^{-3}$$

$$-150i_1 + 1500i + 2400(i - 2.5 \times 10^{-3}) = 0$$

$$-150(i - 2.5 \times 10^{-3}) + 1500i + 2400i - 2400 \times 2.5 \times 10^{-3} = 0$$

$$3900i - 150i = 2400 \times 2.5 \times 10^{-3} - 150 \times 2.5 \times 10^{-3}$$

$$3750i = 6 - 0.375 = 5.625$$

$$i = 1.5 \text{ mA}$$

$$i_1 = 1.5 - 2.5 = -1 \text{ mA}$$

ÇÖZÜM 2 -) Kararlı halde kondansatör açık devredir.

$$v(0) = \frac{40}{90} \times 9 = 4 \text{ V}$$

$t > 0$ için

$$\frac{1}{32} \frac{dv}{dt} + \frac{v}{9} + \frac{v}{72} = 0, \quad \frac{1}{32} \frac{dv}{dt} + \frac{9v}{72} = 0$$

$$\frac{dv}{dt} + 4v = 0, \quad s + 4 = 0, \quad s = -4$$

$$v = Ae^{-4t}$$

$$v(0) = 4 = Ae^{-4 \times 0} = A$$

$$v = 4e^{-4t}$$

ÇÖZÜM 3 -)

$$\frac{v^+ - v_2}{15k} + \frac{v^+}{5k} = 0, \quad v^+ - v_2 + 3v^+ = 0, \quad v_2 = 4v^+$$

$$\frac{v^- - v_1}{20k} + \frac{v^- - v_2}{10k} = 0, \quad v^- - v_1 + 2v^- - 2v_2 = 0, \quad 3v^- = v_1 + 2v_2$$

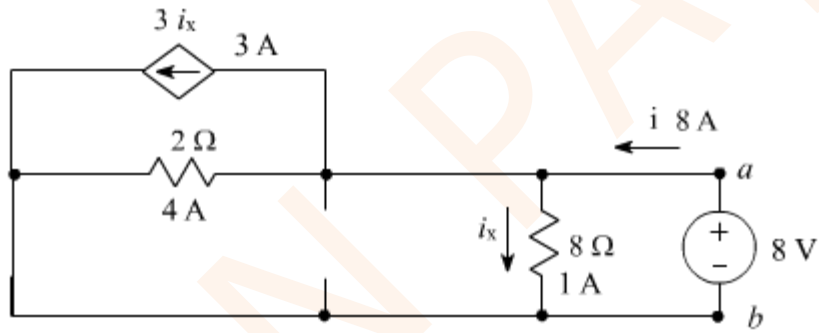
$$\left. \begin{array}{l} 3v_2 = 12v^+ \\ 12v^- = 4v_1 + 8v_2 \end{array} \right\} \begin{array}{l} 3v_2 = 4v_1 + 8v_2, \quad -5v_2 = 4v_1, \quad \frac{v_2}{v_1} = -\frac{4}{5} \end{array}$$

ÇÖZÜM 4 -)

$$\frac{v_a - 24}{2} + 3i_x + 4 + \frac{v_a}{8} = 0, \quad i_x = \frac{v_a}{8}$$

$$\frac{v_a}{2} + 3\frac{v_a}{8} + \frac{v_a}{8} = 12 - 4 = 8, \quad v_a = v_{oc} = v_{Th} = 8V$$

Thevenin direncini 3. metotla bulalım.



Şekil 4

$$R_{Th} = R_L = \frac{v_g}{i_g} = \frac{8}{8} = 1\Omega$$

$$P_{\max} = \left(\frac{8}{2}\right)^2 \times 1 = 16W$$