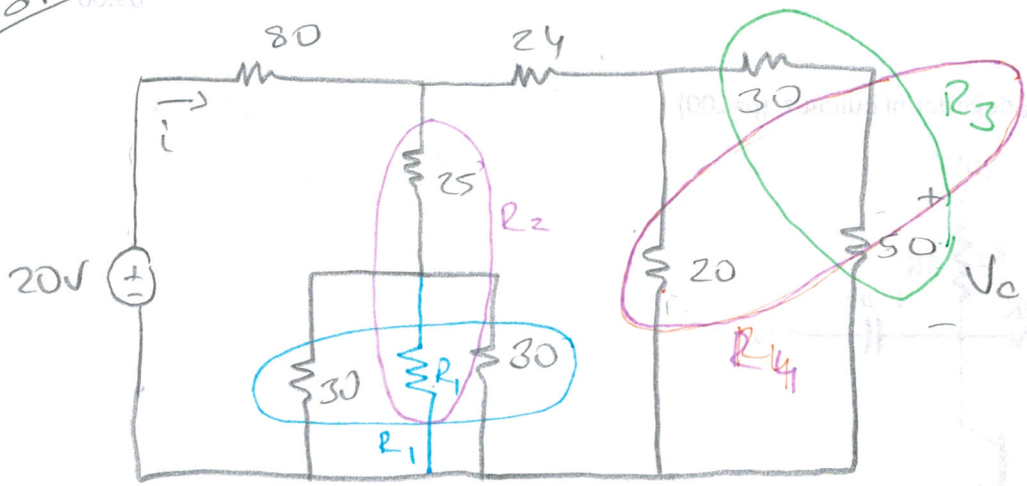
Soru 1



$$R_1 = 30 // 30 = \frac{30.30}{60} = 15\,\Omega$$

$$R_2 = 25 + 15 = 40\,\Omega$$

$$R_3 = 30 + 50 = 80\,\Omega$$

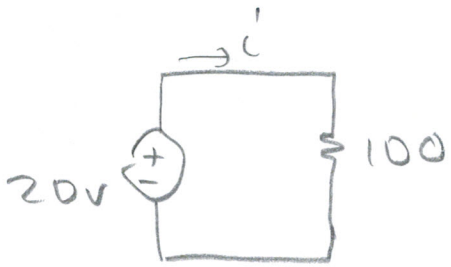
$$R_4 = 20 // R_3 = \frac{20.80}{100} = 16\,\Omega$$

$$R_5 = 24 + 16 = 40\,\Omega$$

$$R_6 = R_2 // R_5$$

$$R_6 = \frac{40.40}{80} = 20\,\Omega$$

$$R_7 = 80 + R_6 = 100\,\Omega$$

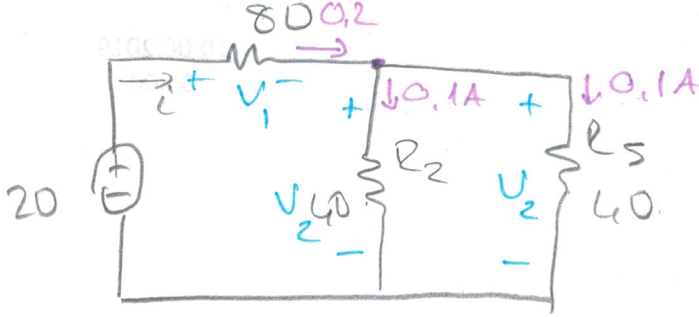


$$U = I\,R$$

$$20 = I \cdot 100$$

$$\Rightarrow I = 0{,}2\,A$$

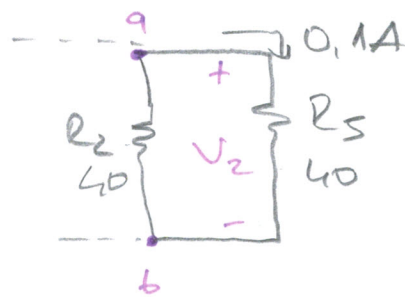
(15)



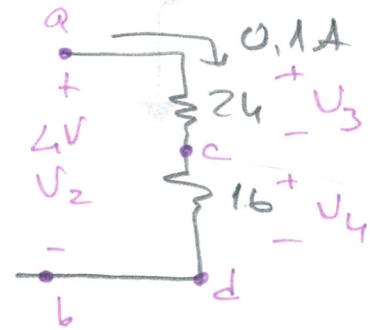
$i = 0,2\,A$

$V_1 = 80 \cdot i = 80 \cdot 0,2 = 16V$

$V_2 = 20 - V_1 = 20 - 16 = 4V$



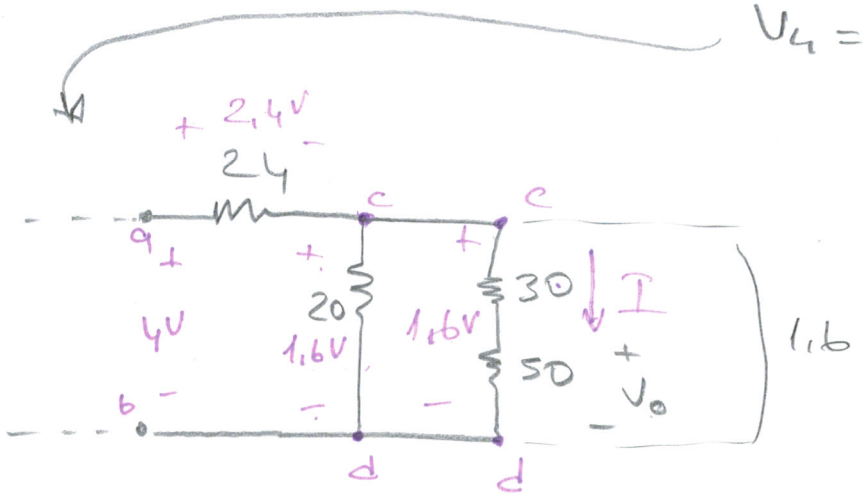
$\Rightarrow$



$V_2 = V_3 + V_4$

$4 = 0,1 \cdot 24 + 16 \cdot 0,1$

$V_4 = 0,1 \cdot 16 = 1,6V$

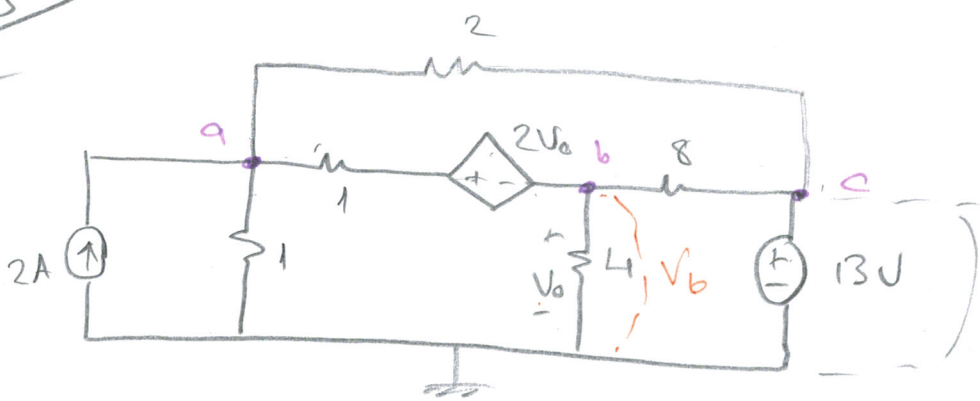


$\frac{V_{cd}}{30+50} = I \rightarrow I = \frac{1,6}{80}$

$V_o = I \cdot 50 = \frac{1,6}{80} \cdot 50$ (0,2)

(15) $V_o = 1V$

Soru 2



$V_c = 13V$ (5)

$V_b = V_o$ (5)

Düğüm a =) $-2 + \frac{V_a}{1} + \frac{V_a - 13}{2} + \frac{V_a - (V_b + 2V_o)}{1} = 0$ (9)

Düğüm b =) $\frac{V_b - (V_a - 2V_o)}{1} + \frac{V_b}{4} + \frac{V_b - 13}{8} = 0$ (9)

$$-2 + V_a + \frac{V_a - 13}{2} + V_a - 3V_o = 0$$

$$-4 + 2V_a + V_a - 13 + 2V_a - 6V_o = 0$$

$$5V_a - 6V_o = 17 \quad \text{---} \quad (1)$$

(7)

$$V_b - V_a + 2V_o + \frac{V_o}{4} + \frac{V_o - 13}{8} = 0$$

$$8V_o - 8V_a + 16V_o + 2V_o + V_o - 13 = 0$$

$$-8V_a + 27V_o = 13 \quad \text{---} \quad (2)$$

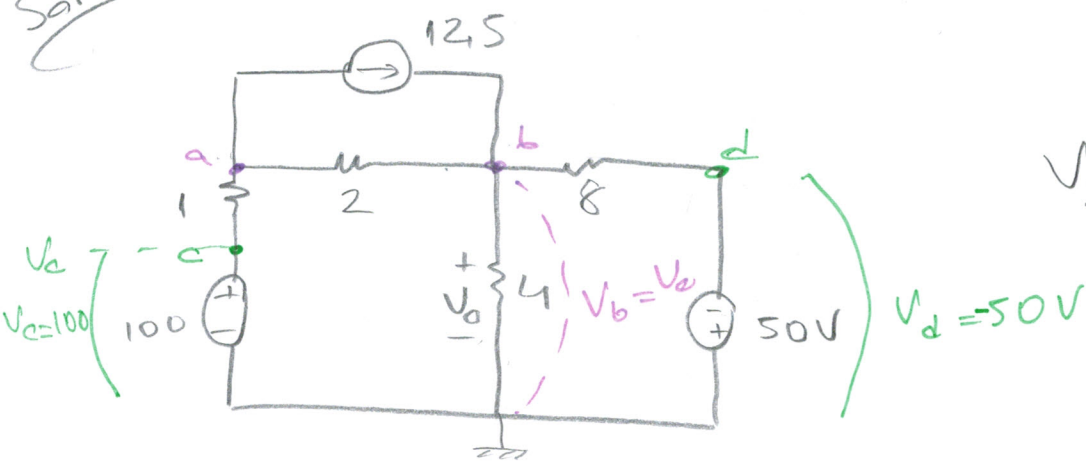
$$8 \,/\, 5V_a - 6V_o = 17$$
$$5 \,/\, -8V_a + 27V_o = 13$$

$$40V_a - 48V_o = 136$$
$$-40V_a + 135V_o = 65$$

$$87V_o = 201$$

$$V_o = 2{,}3\ V$$

Soru 3



$V_b = V_o$ --- (6)

Düğüm a

$$\frac{V_a - 100}{1} + \frac{V_a - V_b}{2} + 12,5 = 0 \quad \text{(12)}$$

$$V_a - 100 + \frac{V_a - V_o}{2} + 12,5 = 0$$

$$2V_a - 200 + V_a - V_o + 25 = 0$$

$$3V_a - V_o = 175 \quad \text{--- (1)}$$

Düğüm b

$$\frac{V_b - (-50)}{8} + \frac{V_b}{4} + \frac{V_b - V_a}{2} - 12,5 = 0 \quad \text{--- (12)}$$

$$V_b + 50 + 2V_b + 4V_b - 4V_a = 100$$

$$-4V_a + 7V_o = 150 \quad \text{--- (2)}$$

$$4 / 3V_a - V_o = 175$$
$$3 / -4V_a + 7V_o = 150$$

$$12V_a - 4V_o = 700$$
$$-12V_a + 21V_o = 150$$

(5)

$$17V_o = 850$$

$$V_o = 50\ V$$