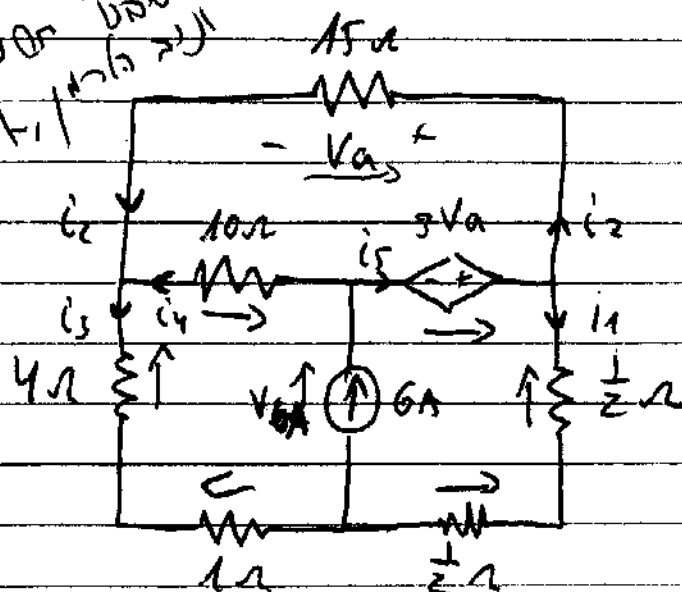


3 for 1000
1 for 1000
pk/14.1

3 / 1000

①



$$1 + i_3 \cdot 4 + i_4 \cdot 10 + 3V_a = \left(\frac{1}{2} + \frac{1}{2}\right) i_1 \Rightarrow 5i_3 + 4i_4 + 3 \cdot 15 \cdot i_2 = i_1$$

$$i_4 \cdot 10 + 3V_a = V_a \Rightarrow i_4 \cdot 10 = -2V_a = -2 \cdot i_2 \cdot 15 = -30i_2$$

$$\cancel{6A} \quad i_1 + i_2 = i_5$$

$$i_3 + i_1 = 6$$

$$i_2 + i_4 = i_3$$

$$i_1 = 10A \quad i_2 = +2A \quad i_3 = \cancel{10A} - 4A$$

$$i_5 = 12A \quad i_4 = -6A \quad V_a = 15 \cdot i_2 = 30V$$

$$V_{CA} = 4 \cdot i_3 + i_4 \cdot 10 + i_3 = -16 - 60 - 4 = -80V$$

$$P_{15\Omega} = I_2^2 R = 4 \cdot 15 = 60W$$

$$P_{4\Omega} = (i_3)^2 \cdot R = 16 \cdot 4 = 64W$$

$$P_{1\Omega} = (i_4)^2 \cdot R = 16 \cdot 1 = 16W$$

$$P_{\frac{1}{2}\Omega} = (i_1)^2 \cdot R = 100 \cdot \frac{1}{2} = 50W$$

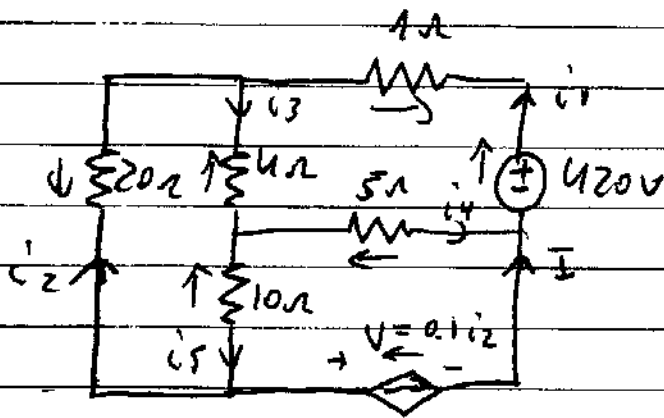
$$P_{\frac{1}{2}\Omega} = (i_1)^2 \cdot R = 100 \cdot \frac{1}{2} = 50W$$

$$P_{V_a} = -3V_a \cdot i_5 = -90 \cdot 12 = -1080W$$

$$P_{6A} = 80 \cdot 6 = 480W$$

$$P_{10\Omega} = (i_4)^2 \cdot R = 36 \cdot 10 = 360$$

$$P_{TOTAL} = 0$$



$$i_1 + i_2 = i_3$$

$$i_3 = i_4 + i_5$$

$$I + i_4 = i_1$$

$$0.1i_2 + i_5 \cdot 10 = i_4 \cdot 5$$

$$5 \cdot i_4 + i_3 \cdot 4 + i_1 \cdot 1 = 420$$

$$i_2 \cdot 20 + i_3 \cdot 4 + i_5 \cdot 10 = 0$$

$$i_2 = -17.7 \text{ A}$$

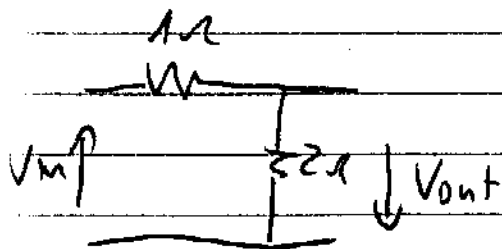
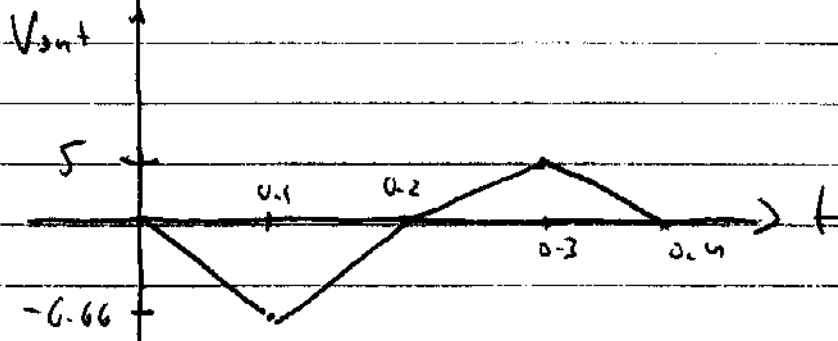
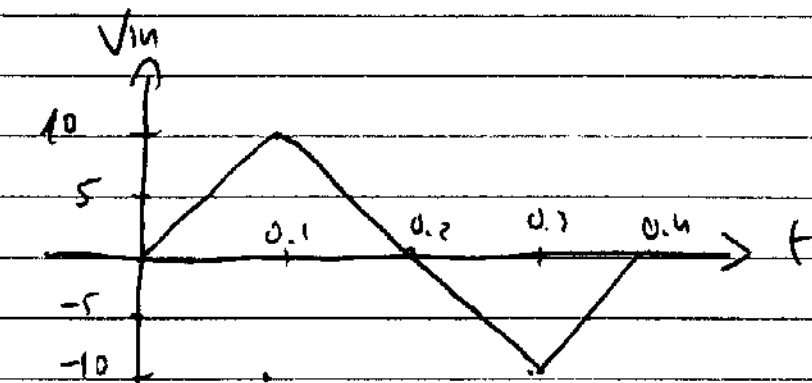
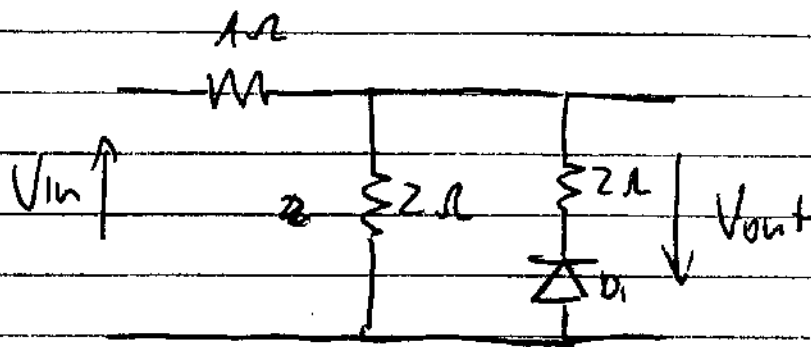
$$i_1 = 66 \text{ A}$$

$$i_4 = 32.2 \text{ A}$$

$$i_5 = 16.1 \text{ A}$$

$$i_3 = 48.3 \text{ A}$$

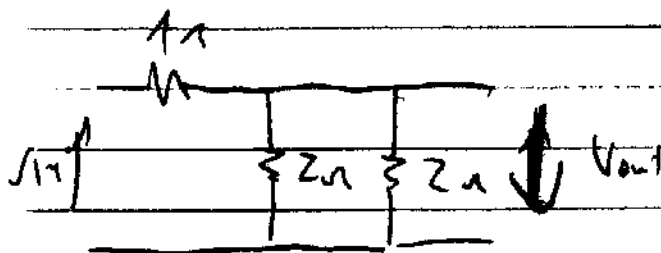
$$I = 33.8 \text{ A}$$



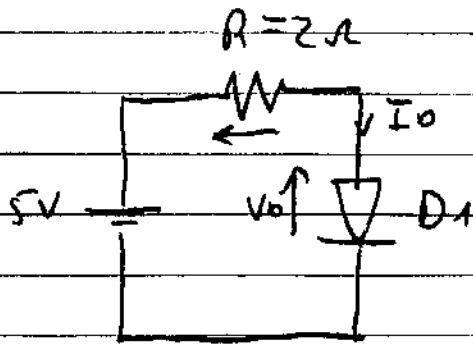
\Leftarrow \nearrow D_1 \Leftarrow $V_{in} > 0$ rel

$$V_{out} = - \frac{V_{in} \cdot 2}{3}$$

\Leftarrow \nearrow D_1 \Leftarrow $V_{in} < 0$ rel



$$V_{out} = - \frac{V_{in}}{2}$$



4

1

$$I_D \cdot 2 + V_D = 5$$

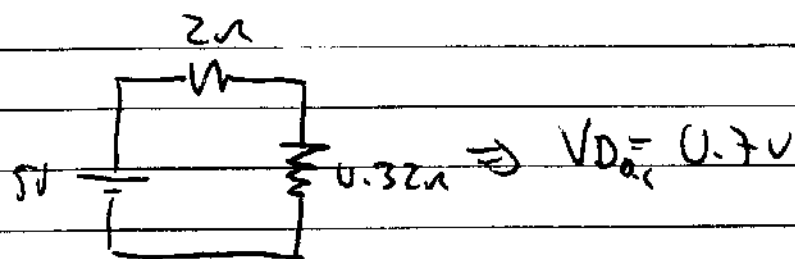
נבדוק, לראות היכן נמצא נקודת הפיתרון
 $I_D = 2.15, V_D = 0.7$ (נראה כי זהו הפיתרון)

$$V_D = 0.7V \quad I_D = 2.15A$$

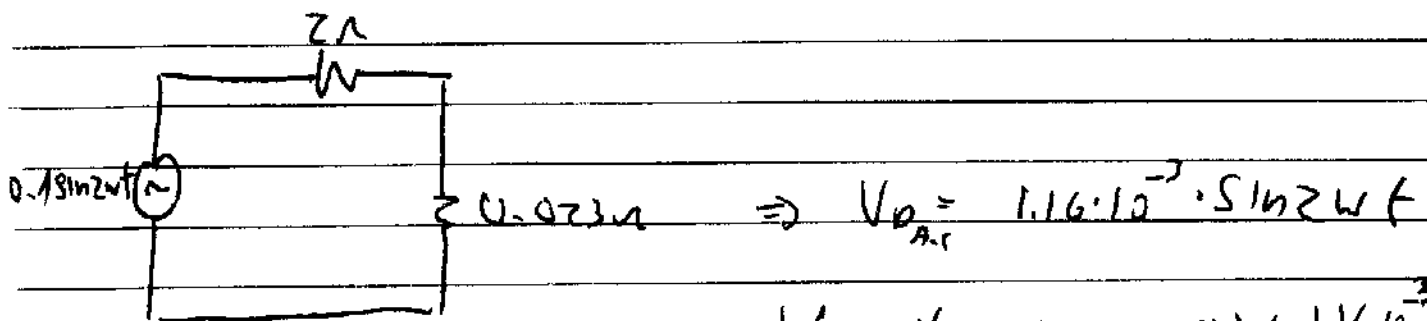
2

$$R_s = \frac{V_D}{I_D} = \frac{0.7V}{2.15A} = 0.32\Omega$$

$$R_0 = \frac{50mV}{I_{D0} = 2.15} = 0.023\Omega$$

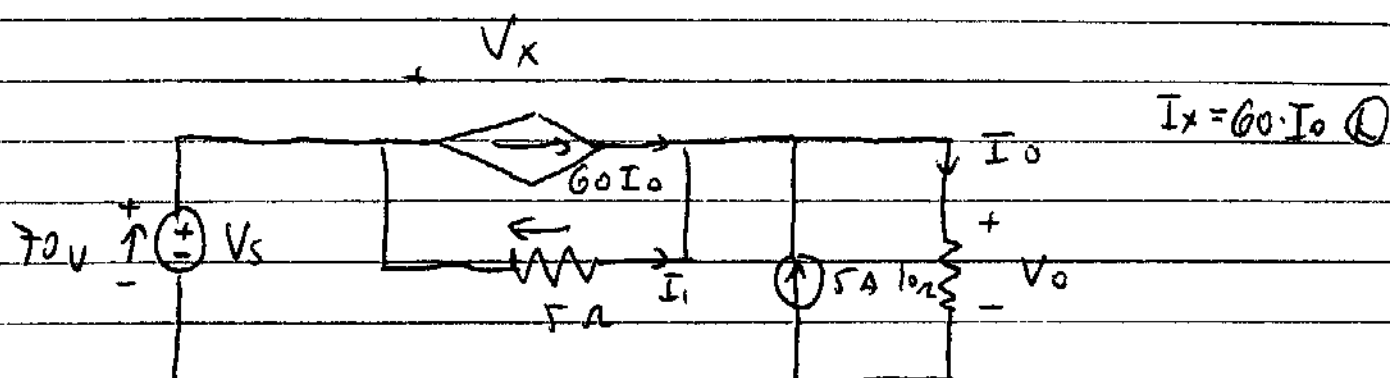


3



$$V_D = V_{D_{DC}} + V_{D_{AC}} = 0.7 + 1.16 \cdot 10^{-3} \cdot \sin(2\omega t)$$

(5)



$$60I_0 + I_1 + 5 = I_0 \Rightarrow I_1 = -59I_0 - 5$$

$$\frac{V_x}{5} = I_1$$

$$70 = 5 \cdot I_1 + 10 \cdot I_0 \Rightarrow \frac{70 - 10I_0}{5} = I_1 = 14 - 2I_0$$

$$14 - 2I_0 = -5 - 59I_0$$

$$57I_0 = -19$$

$$I_0 = -\frac{19}{57} A$$

$$I_1 = 14 - 2I_0 = 14 + \frac{38}{57} = 14\frac{2}{3} A$$

$$V_x = 5 \cdot I_1 = 73\frac{1}{3} V$$

$$600I_0 = 60 \cdot 10 \cdot I_0 = I_x = 60V_o \quad \text{pk (2)}$$

$$600I_0 + I_1 + 5 = I_0 \Rightarrow I_1 = -599I_0 - 5$$

$$I_1 = 14 - 2I_0$$

$$14 - 2I_0 = -599I_0 - 5$$

$$19 = -597I_0$$

$$I_0 = -0.032 A$$

$$I_1 = 14 + 2 \cdot 0.032 = 14.06 A$$

$$V_x = 5 \cdot I_1 = 70.32 V //$$