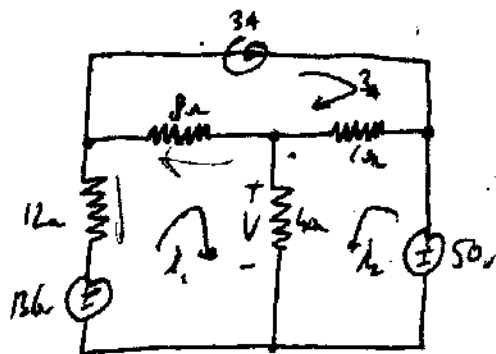


פתרון 4
 למציאת ההספק
 המרבי



700W

$$\begin{cases} 136 = 60i_1 + 40i_2 - 24 \\ 50 = 40i_1 + 50i_2 + 30 \\ 0 = -8i_1 + 10i_2 + 54 \end{cases}$$

⇓

$$\Delta = 1400$$

$$\Delta i_1 = 7200$$

$$\Delta i_2 = -5200$$

⇓

$$i_1 = \frac{\Delta i_1}{\Delta} = 5.14A$$

⇓

$$i_2 = \frac{\Delta i_2}{\Delta} = -3.714A$$

$$V = (i_1 + i_2) \cdot 40 = 1.425 \cdot 40 = \underline{\underline{57V}}$$

$$P_{12\Omega} = i_1^2 R = 317m$$

$$P_{136V} = V \cdot i_1 = 699W$$

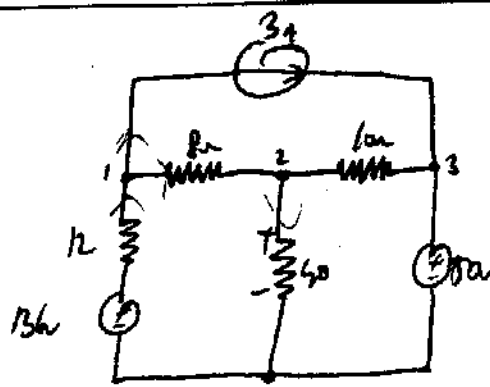
$$P_{40\Omega} = (i_1 + i_2)^2 \cdot 40 = 81.33W$$

$$P_{50\Omega} = i_2^2 \cdot 50 = 185.7W$$

$$P_{34V} = (3A + i_2)^2 \cdot R = 5.1W$$

$$P_{8\Omega} = (i_1 - 3A)^2 \cdot R = 36.6W$$

3.1



2/13 'pm

$$\begin{cases} \frac{V_1 - 136}{12} + 3 + \frac{V_1 - V_2}{8} = 0 \\ \frac{V_2 - V_1}{8} + \frac{V_2 - V_3}{10} + \frac{V_2}{40} = 0 \\ V_3 = 50 \end{cases}$$

$V_2 = 57.1$ is given by the voltage across the 40Ω resistor
 $V_1 = 74.26$

$$P_{12} = \left(\frac{V_1 - 136}{12} \right)^2 \cdot 12 = 377.06 \text{ W}$$

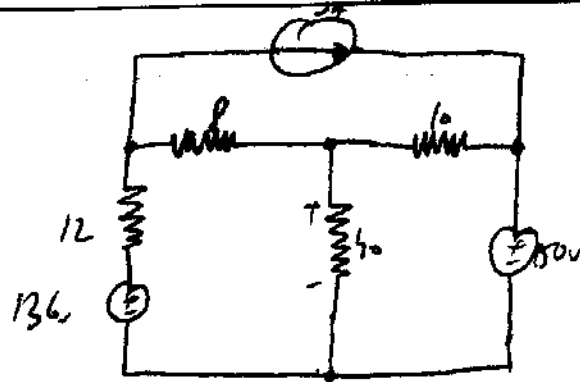
$$P_{136} = \left(\frac{V_1 - 136}{12} \right)^2 \cdot 136 = 700 \text{ W}$$

$$P_{8} = \left(\frac{V_2 - V_1}{8} \right)^2 \cdot 8 = 36.8 \text{ W}$$

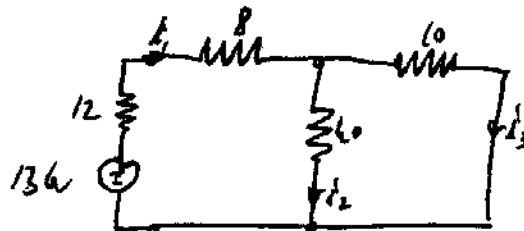
$$P_{40} = \left(\frac{V_2}{40} \right)^2 \cdot 40 = 81.5 \text{ W}$$

$$P_{10} = \left(\frac{V_2 - V_3}{10} \right)^2 \cdot 10 = 5 \text{ W}$$

$$P_{50} = (3 + 0.11) \cdot 50 = 155.5 \text{ W}$$

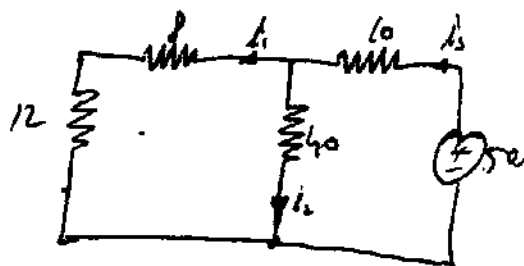


23/5/22/6



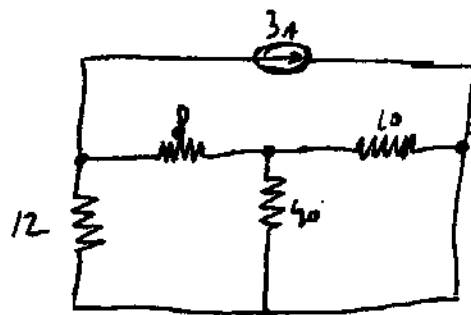
• 50V 2/3/7 ①
• 3A 1/2/1

$$R_t = 28\Omega \quad i_1 = 4.95A \quad i_2 = 0.97A \quad i_3 = 3.88A$$



• 136V 2/3/7 ②
• 3A 1/2/1

$$R_t = 23.33\Omega \quad i_3 = 2.14A \quad i_1 = 1.42A \quad i_2 = 0.71A$$



• 136V 2/3/7 ③
• 50V 2/3/7

$$i_{40\Omega} = -0.225A$$

$$i_{10\Omega} = -0.9A$$

$$i_{12\Omega} = 0.75A$$

$$i_{2\Omega} = -2.25A$$

③.3

$$V = [i_1^{(1)} + i_2^{(2)} + i_3^{(3)}] \cdot 40 = [0.97 + 0.71 - 0.225] \cdot 40$$

$$V = \underline{\underline{58.2\text{V}}}$$

$$P_{40\Omega} = 84.686\text{W}$$

$$P_{3\Omega} = 568\text{W}$$

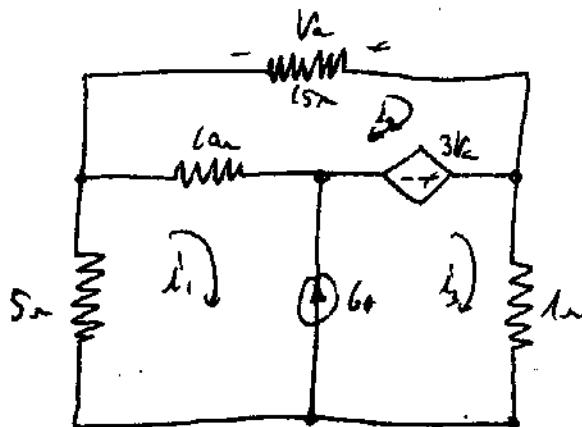
$$P_{12\Omega} = 209\text{W}$$

$$P_{5\Omega} = 11.13\text{W}$$

$$P_{10\Omega} = 7\text{W}$$

$$P_{32\Omega} = 237\text{W}$$

1/4, 1/30 i_1, i_2, i_3 - $i_{10\Omega}$ \rightarrow $i_{3\Omega}$ $i_{12\Omega}$ $i_{5\Omega}$ $i_{10\Omega}$ $i_{32\Omega}$ (5)



$$\begin{cases} i_3 - i_1 = 6\text{A} \\ (5+10)i_1 - 10i_2 - 3V_A + i_3 \cdot 1 = 0 \\ (10+15)i_2 - 3V_A - 10i_1 = 0 \\ V_A = -15i_2 \end{cases}$$

(3.4)

$$I_1 = 4A$$

$$I_2 = -2A$$

$$I_3 = 10A$$

$$\therefore \frac{1}{10} - \frac{1}{10} = \frac{1}{10} - \frac{1}{10}$$

$$P_{15\Omega} = (-2)^2 \cdot 15 = 60W$$

$$P_{3\Omega} = (4)^2 \cdot 3 = 48W$$

$$P_{2\Omega} = (4)^2 \cdot 2 = 32W$$

$$P_{10\Omega} = (I_1 - I_2)^2 \cdot 10 = (4 - (-2))^2 \cdot 10 = 360W$$

$$P_{1\Omega} = (10)^2 \cdot 1 = 100W$$

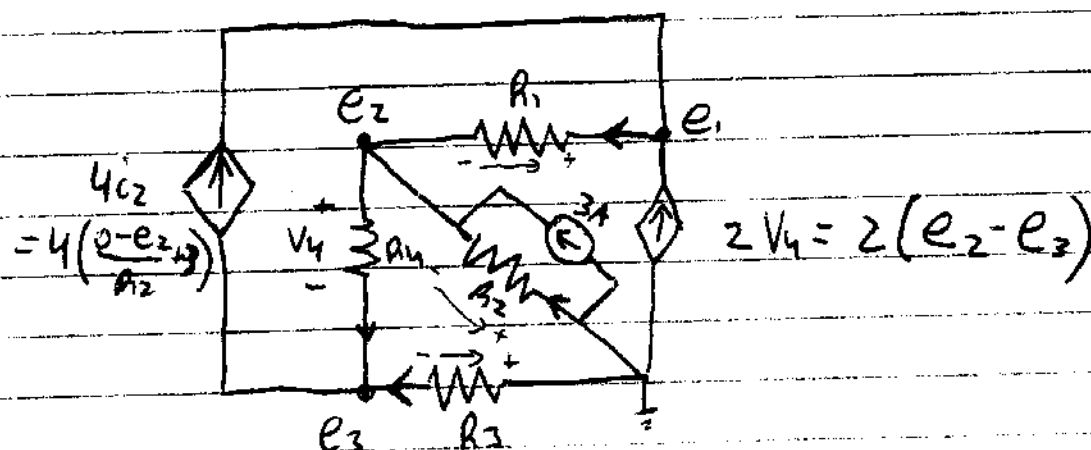
$$P_{15\Omega} = \frac{V_a^2}{15} = 60W$$

$$V_a = -15I_2 = 30V$$

$$P_{3V_a} = (3 \cdot V_a) (I_3 - I_1) = (3 \cdot 30) (10 - 4) = 600W$$

$$P_{6A} = 6 \cdot V_{6A} = 6 \cdot [3V_a + I_3 \cdot 1\Omega] = 6[90 + 10] = 600W$$

נמיר את מקור המתח למקור זרם. כלומר נכלול את
הפרמטרים הדיסקרים בצורה מסוימת הנלווית



$$e_1: \textcircled{1} \quad +2(e_2 - e_3) + 4\left(3 - \frac{e_2}{2}\right) - \frac{e_1 - e_3}{1} = 0$$

$$-e_1 + e_2 - 2e_3 = -12 \Rightarrow \boxed{e_1 - e_2 + 2e_3 = 12}$$

$$e_2: \textcircled{2} \quad 3 + \frac{0 - e_3}{2} + \frac{e_1 - e_2}{1} - \frac{e_2 - e_3}{4} = 0$$

$$e_1 - e_2 \cdot \left(\frac{1}{2} + 1 + \frac{1}{4}\right) + \frac{e_3}{4} = -3 \Rightarrow \boxed{-e_1 + e_2 \cdot 1.75 - \frac{e_3}{4} = -3}$$

$$e_3: \textcircled{3} \quad \frac{0 - e_3}{3} + \frac{e_2 - e_3}{4} - 4\left(3 - \frac{e_2}{2}\right) = 0 = \frac{-e_3}{1} + \frac{e_2 - e_3}{4} - 12 + \frac{4e_2}{2}$$

$$\boxed{\frac{9 \cdot e_2}{4} - \frac{5}{4} e_3 = 12}$$

$$\begin{aligned} e_1 &= 10 \\ e_2 &= 8.154 \\ e_3 &= 5.077 \end{aligned}$$

החלפת 3-N