



$$V_x = V_c - (9 + V_B) = V_c - 9 - V_B$$

Ⓐ Node A:  $V_A = -12V$

Ⓐ Node B:  $I_1 + I_3 = I_2 \Rightarrow$

$$\Rightarrow \frac{V_A - V_B}{2} + \frac{V_c - 9 - V_B}{1} = \frac{V_B}{4} \Rightarrow$$

$$\Rightarrow 2(-12 - V_B) + 4(V_c - 9 - V_B) = V_B \Rightarrow$$

$$\Rightarrow -24 - 2V_B + 4V_c - 36 - 4V_B - V_B = 0 \Rightarrow$$

$$\Rightarrow \boxed{-7V_B + 4V_c = 60} \quad (1)$$

Ⓐ Node C:  $0,8V_x = I_3 + I_4 \Rightarrow$

$$\Rightarrow 0,8(V_c - 9 - V_B) = \frac{V_c - 9 - V_B}{1} + \frac{V_c}{8} \Rightarrow$$



$$I_{12V} = I_1 + 0,8V \times \Rightarrow$$

$$\Rightarrow I_{12V} = \frac{-12 + 8,33}{2} + 0,8(0,4000 - 9 + 8,33) \Rightarrow$$

$$\Rightarrow I_{12V} = -1,835 - 0,235 = -2,07 \text{ A}$$

$$P_{12V} = (-2,07)(0 - (-12)) = (-2,07 \cdot 12) = \underline{\underline{-24,84 \text{ W}}}$$

Anodisier

$$P_{9V} = 9 \cdot I_3 = 9 \cdot \frac{(V_C - 9 - V_D)}{1} \Rightarrow$$

$$\Rightarrow P_{9V} = 9 \cdot (-0,264) = \underline{\underline{-2,37 \text{ W}}}$$

Anodisier

$$P_{2\Omega} = \frac{(V_A - V_B)^2}{2} = \frac{(13,46)^2}{2} = 6,734 \text{ W}$$

$$P_{4\Omega} = \frac{(V_B - 0)^2}{4} = \frac{69,38}{4} = 17,34 \text{ W}$$

$$P_{1\Omega} = I_3^2 = 0,0096 \text{ W}$$

②

$$\Rightarrow 0,8V_C - 7,2 - 0,8V_B = V_C - 9 - V_B + \frac{V_C}{8} \Rightarrow$$

$$\Rightarrow 6,4V_C - 57,6 - 6,4V_B - 8V_C + 72 + 8V_B - V_C = 0$$

$$\Rightarrow \boxed{1,6V_B - 2,6V_C = -14,4} \quad (2)$$

Cramer's' rule :

$$V_B = -8,33 \text{ V} \quad V_C = 0,406 \text{ V}$$

$$V_A = -12 \text{ V}$$

$$\begin{aligned} I_{\varepsilon\zeta} &= 0,8(V_C - 9 - V_B) = 0,8(0,406 - 9 - (-8,33)) = \\ &= -0,2033 \text{ A} \quad \{ 203,3 \text{ mA} \} \end{aligned}$$

$$V_{\varepsilon\zeta} = V_A - V_C = -12 - 0,406 = -12,406.$$

$$P_{\varepsilon\zeta} = V_{\varepsilon\zeta} \cdot I_{\varepsilon\zeta} = (-12,406) \cdot (-0,2033) = 2,522 \text{ W}$$

Καταναλωει.

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$$P_{g0} = \frac{(V_c - 0)^2}{8} = 0,0206 \text{ W}$$

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Αποδιδόμενα ισχύος στο κύκλωμα:

$$P_{9V} + P_{12V} = |-24,84 - 2,37| = |-27,21 \text{ W}| = \underline{\underline{27,21 \text{ W}}}$$

Καταναλωθέντα ισχύς στο κύκλωμα.

(αυτοθέρμανση + εξωτερική πηγή)

$$P_{R3} + P_{R2} + P_{R4} + P_{R1} + P_{g0} =$$

$$= 2,522 + 6,734 + 17,34 + 0,0696 + 0,0206 =$$

$$= \underline{\underline{26,68 \text{ W}}}$$

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