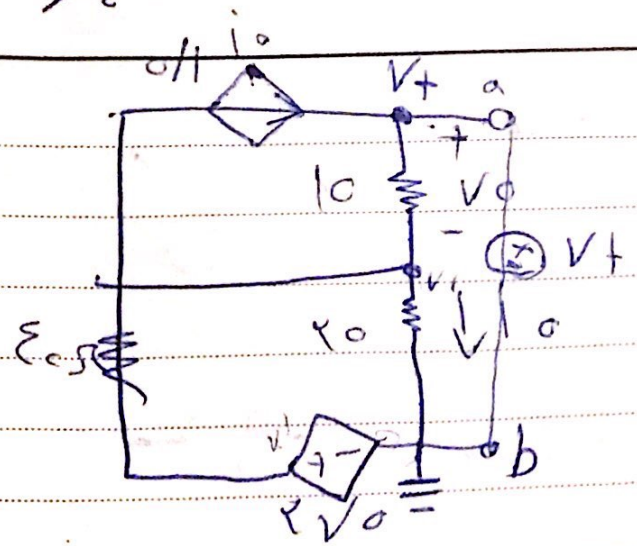
Subject:
Date



$$KCL\ V_+ = \frac{V_+ - V_1}{10} - 0 \quad // \quad i_o - i_+ = 0$$

$$KCL\ V_1 = \frac{V_1 - V_+}{10} + \frac{V_1}{20} + \frac{V_1 - 2V_o}{40} \quad // \quad i_2 = 0$$

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$V' = 0.2 V_c$

می‌دانیم

$0 \quad i_0 = \frac{V_1 - 0}{20}$ و $V_t - V_1 = V_0$

$KCL\ V_t = V_t - V_1 - i_0 - 10 i_t = 0$

$V_t - V_1 - \frac{V_1}{20} - 10 i_t = 0$

$20 V_t - 21 V_1 - 200 I_t \Rightarrow V_1 = \frac{20 V_t - 200 I_t}{21}$

$KCL\ V_t = 4V_1 - 4V_t + 2V_1 + V_1 - 2V_0 + \frac{4 i_0}{20}$

$V_1 = \frac{30}{49} V_t \Rightarrow \frac{20 V_t - 200 I_t}{21} = \frac{30}{49} V_t$

$920 V_t - 9200 I_t = 630 V_t$

$V_t = \underbrace{21.73}_{R_{th}} I_t + \underbrace{0}_{V_{th}}$

$I_N = 0$

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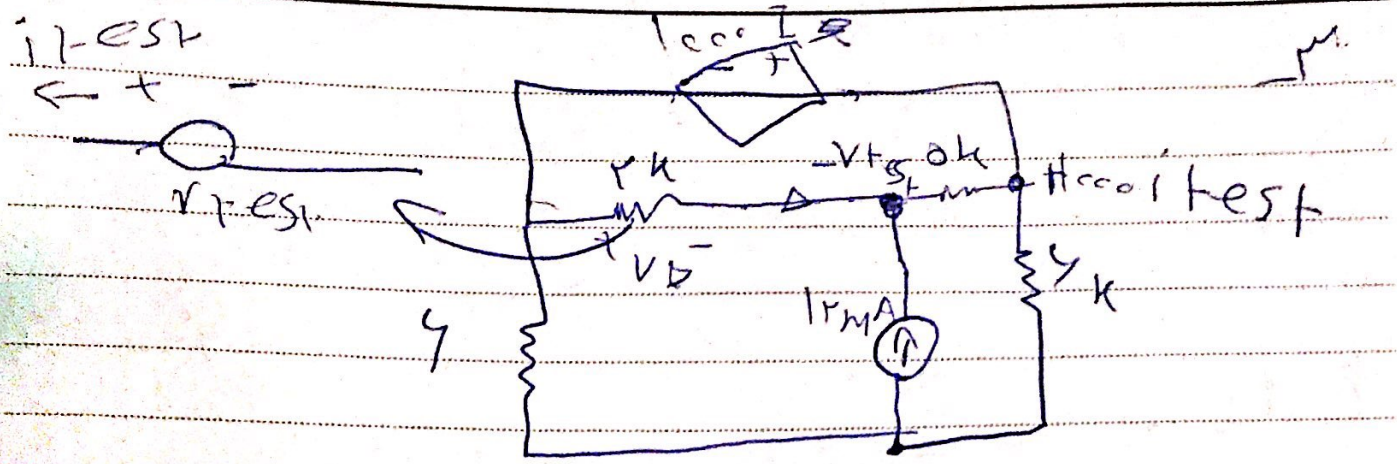
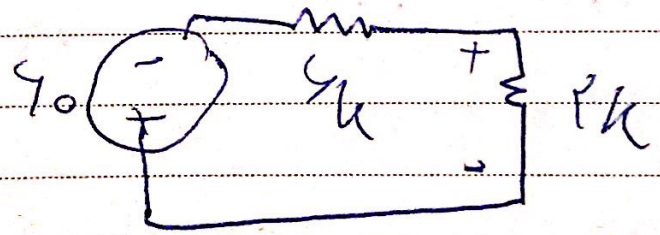


$$KCL_{test}: i_{test} + 2m + \frac{1000 i_{test} - v_{test}}{5k} = 0$$

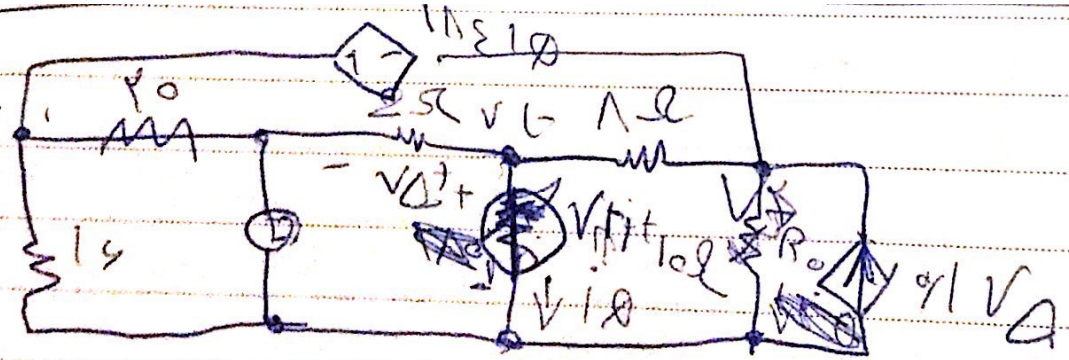
$$\Rightarrow 5k\, i_{test} - 60 + 1k\, i_{test} - v_{test} = 0$$

$$\rightarrow v_{test} = \underbrace{6k}_{R_{Th}}\, i_{test} - \underbrace{60}_{V_{th}}$$

مدار معادل



$V_x = -10$



$i_\phi = -i_t$

$V_\Delta - V_t = 180$

$$KCL_{1,2}: \frac{V_1}{16} + \frac{V_1 - 180}{20} + \frac{V_1 - 180}{20} + \frac{V_2 - V_t}{8} + \frac{V_2}{10} + \frac{180 - V_t}{10} = 0$$

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الف) $R_0 = R + h = ۱۶\ \Omega$

ب) $P = \frac{V^۲}{R} = ۴۰۰\ W$

در معادلات دایم

ج) $V_t = ۸۰$

$I_t = -۵ \rightarrow V_۲ = -۲۸۰$

$V_۱ = ۶۴۰$

$KCL: \frac{۱۸۰ - ۸۰}{۲} + \frac{۱۸۰ - ۶۴۰}{۲۰} + ۱۸۰ = ۰$

$I_{۱۸۰} = -۲۷ \rightarrow P_{۱۸۰} = ۲۷ \times ۱۸۰ = ۴۸۶۰\ W$

$\frac{RR_0}{R_{۱۸۰}} = \frac{۴۰۰}{۴۸۶۰} = ۸٫۲۳\%$

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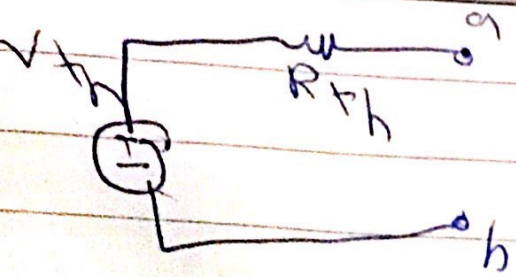


ج-

حالت اول $i = \frac{6}{10k} = 0.6\ mA$

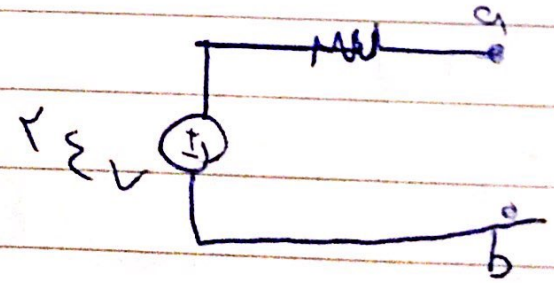
$V_{th} = 0.6m(R_{th} + 10k)$

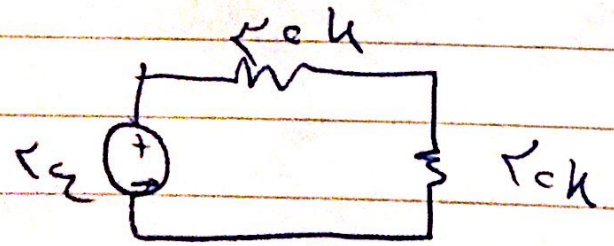
حالت دوم $i = \frac{12}{30k} = 0.4\ mA$

$V_{th} = 0.4(R_{th} + 30k)$

الف) $6R_{th} + 60k = 4R_{th} + 120k$

$R_{th} = 30k \rightarrow V_{th} = 24\ V$





ب) $V_{Ab} = \frac{20}{50} \times 24 = 9.6\ V$

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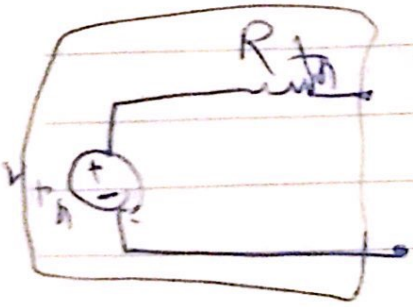
۶- الف) فرض می کنیم خطی باشد



سطر اول . $V_{th} = 1/5(R_{th}+2)$

سطر دوم $V_{th} = 1 \times (R_{th}+4)$

$\Rightarrow R_{th} = 10 \Rightarrow V_{th} = 18$

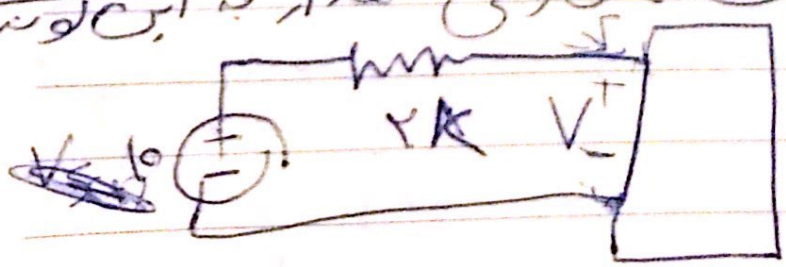
سطر سوم : $V_{th} = 18 = 0/75(10+4)$ ✓

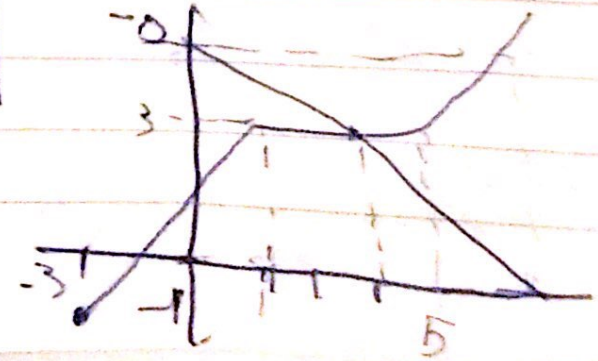
الف) $I = \frac{18}{10+4} = 1/285\ (A)$

ب) $R = R_{th} = 10\Omega \quad V_R = 9 \Rightarrow P_{max} = \frac{V^2}{R}$

$= 8/1\ W$

۷- با استفاده از ساده سازی مدار به این گونه می شود





$V = -2I + 10 \Rightarrow$

$I = 3mA \Rightarrow V = 4$

ALVAND

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