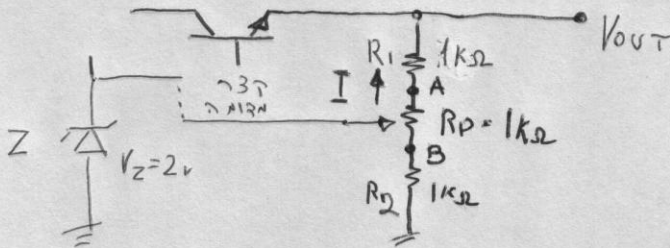


הצגת פתרון
 אלקטרוניקה מחלקים א' 815201 - תשפ"א
 מבוא לתכנון אלקטרוניקה

לפיך
 יוסי גאליצ'ר

עכ"ל 1



א. כחלק הנקודה A

V_Z נופל על $R_p + R_2$ לפי חוק השריטה I

$$I = \frac{V_Z}{R_2 + R_p} = \frac{2V}{2k} = 1mA$$

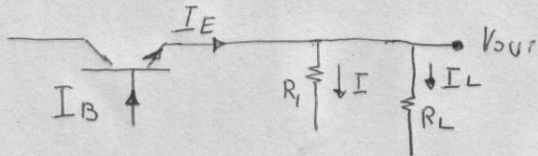
$$V_{out} = I \cdot (R_1 + R_p + R_2) = 1mA \cdot 3k = \underline{3V}$$

ב. כחלק הנקודה B

V_Z נופל על R_2 לפי חוק השריטה I

$$I = \frac{V_Z}{R_2} = \frac{2V}{1k} = 2mA$$

$$V_{out} = I \cdot (R_1 + R_p + R_2) = 2mA \cdot 3k = \underline{6V}$$



ג. שרשרת הסדר

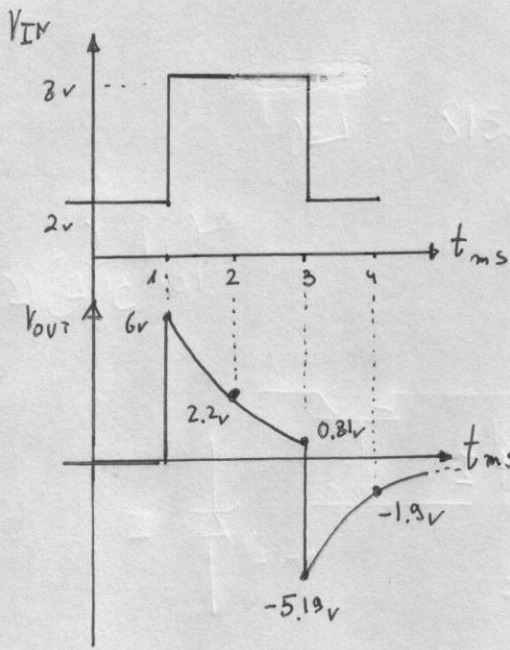
לפיך

$$I = 2mA, V_{out} = 6V$$

$$I_L = \frac{V_{out}}{R_L} = \frac{6V}{100\Omega} = 60mA$$

$$I_E = I + I_L = 2mA + 60mA = 62mA$$

$$I_B = \frac{I_E}{\beta + 1} = \frac{62mA}{100 + 1} = 613.86\mu A$$



H-P $\tau = RC = 10k \cdot 0.1\mu F = 1ms$

$1ms < t < 3ms$ $V_0^+ = 6V, V_{\infty} = 0V$

$$V_t = 0 - (0 - 6) \cdot e^{-\frac{t-1}{\tau}} = 6 \cdot e^{-\frac{t-1}{1ms}}$$

$$t = 2ms \rightarrow V_0 = 6 \cdot e^{-\frac{2-1}{1}} = 2.2V$$

$$t = 3ms \rightarrow V_0 = 6 \cdot e^{-\frac{3-1}{1}} = 0.81V$$

$t = 2ms \rightarrow V_{OUT} = 2.2V$

$t > 3ms$ $V_0^+ = 0.81 - 6 = -5.19V, V_{\infty} = 0V$

$$V_t = 0 - (0 - (-5.19)) \cdot e^{-\frac{t-3}{\tau}} = -5.19 \cdot e^{-\frac{t-3}{1}}$$

$$t = 4ms \rightarrow V_0 = -5.19 \cdot e^{-\frac{4-3}{1}} = -1.9V$$

$t = 4ms \rightarrow V_{OUT} = -1.9V$

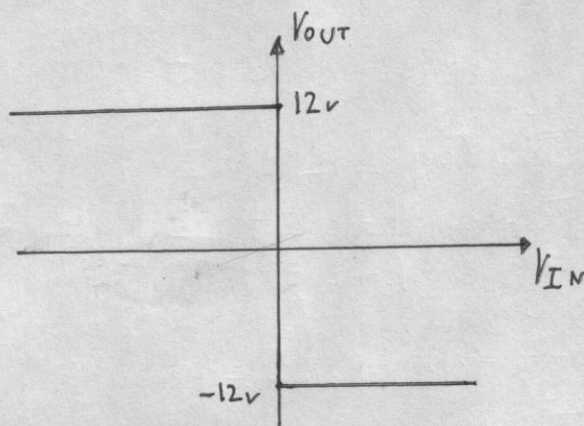
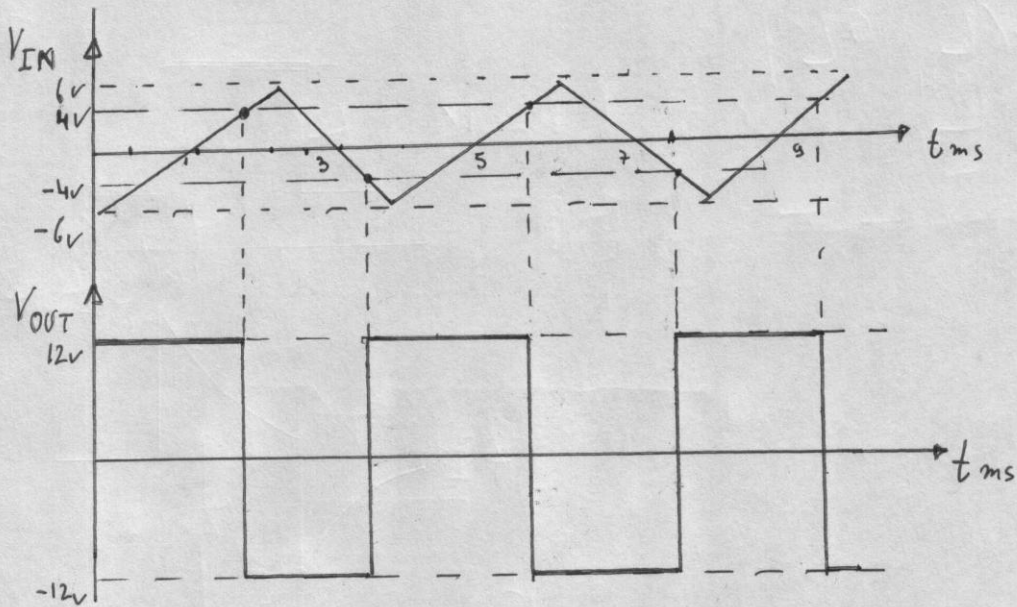
$V' = 4V$ $V_0 = V_{OH} = 12V$

relca j'atlen o r .k

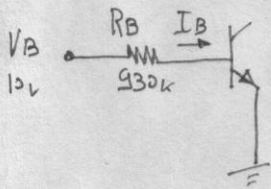
$$V' = V_0 \frac{R_1}{R_1 + R_2} \rightarrow R_2 = \frac{V_0 \cdot R_1}{V'} - R_1$$

$$R_2 = \frac{12V \cdot 4k\Omega}{4V} - 4k\Omega = 8k\Omega$$

$R_2 = 8k\Omega$



התוצאה היא פונקציה
 $V_o = f(V_i)$

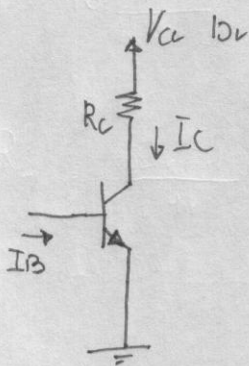


$$I_B = \frac{V_B - V_{BE}}{R_B} = \frac{10 - 0.7}{930k\Omega} = 10\mu A$$

$I_{C1} = \beta I_B$

$I_B = 10\mu A$

$I_{C2} = \beta I_B$



$V_{CE} = 4V$

$I_C = \beta I_B = 100 \cdot 10\mu A = 1mA$

$V_{CC} = I_C \cdot R_C + V_{CE}$

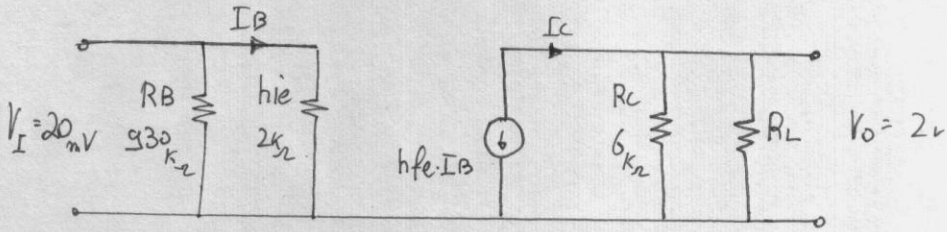
$R_C = \frac{V_{CC} - V_{CE}}{I_C} = \frac{10 - 4}{1mA} = 6k\Omega$

$R_C = 6k\Omega$

Ac \approx 3 μ Γ Γ Γ . c

$V_o = 2v$, $V_{IN} = 20mV$

Ac \approx 3 μ Γ Γ Γ Γ Γ Γ Γ Γ Γ Γ



$I_B = \frac{V_I}{h_{ie}} = \frac{20mV}{2k\Omega} = 10\mu A$

$I_C = h_{fe} \cdot I_B = 100 \cdot 10\mu A = 1mA$

$V_o = I_C \cdot (R_C || R_L) \rightarrow R_C || R_L = \frac{V_o}{I_C} = \frac{2V}{1mA} = 2k\Omega$

$\frac{1}{2k} = \frac{1}{R_C} + \frac{1}{R_L} \rightarrow \frac{1}{R_L} = \frac{1}{2k} - \frac{1}{6k} = \frac{2}{6k}$

$R_L = \frac{6k}{2} = 3k\Omega$

$R_L = 3k\Omega$

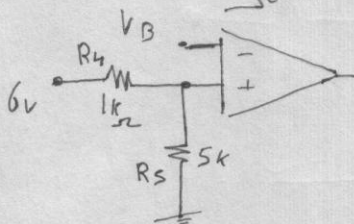
5 Γ Γ Γ Γ e

אזכור $V_A = 4V$ (משהו) $V_A = 4v$. c

$V_A = V_i \cdot (1 + \frac{R_2}{R_1}) \rightarrow V_i = \frac{V_A}{1 + \frac{R_2}{R_1}} = \frac{4V}{1 + \frac{3k\Omega}{1k\Omega}} = 1V$

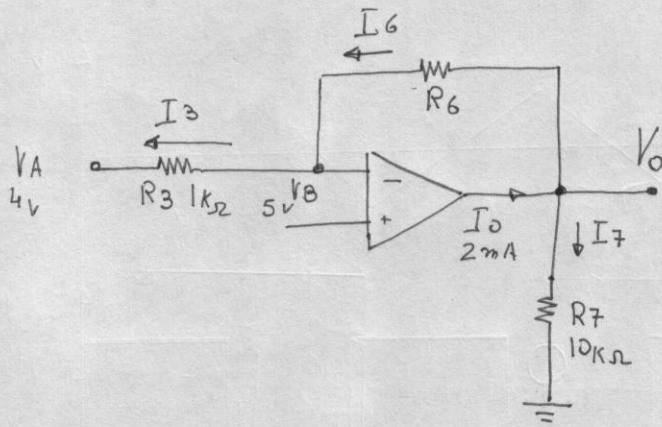
$V_A = 1v$

V_B הכנסת משהו קצת משהו $V_B = 5V$ $V_B = 5V$ $V_B = 5V$



$V_B = 6 \frac{5k}{5k + 1k} = 5V$

$V_B = 5v$



يعني اننا نعلم .c

$$I_3 = \frac{V_B - V_A}{R_3} = \frac{5V - 4V}{1k\Omega} = 1mA$$

$$I_6 = I_3 = 1mA$$

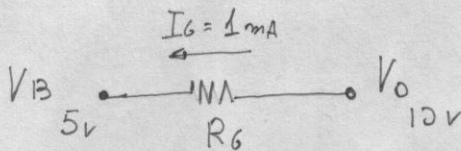
$$I_7 = I_0 - I_6 = 2mA - 1mA = 1mA$$

$$V_0 = I_7 \cdot R_7 = 1mA \cdot 10k\Omega = 10V$$

يعني اننا نعلم .c

10V

$$V_0 = 10V$$



.3

$$R_6 = \frac{V_0 - V_B}{I_6} = \frac{10V - 5V}{1mA} = 5k\Omega$$

$$R_6 = 5k\Omega$$

