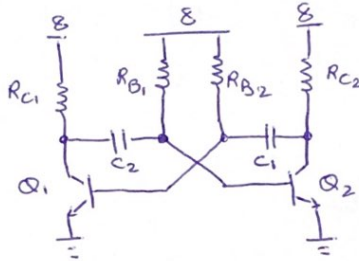رضا ادیب پور

۹۸۱۴۳۳۰۴

تمرین سری ۷ پالس

بسم الله

32-8

$\begin{cases} V_{cc} = 8^V \\ f = 10^{KHZ} \\ D.C = 40\% \\ V_{BE} = 0.7 \\ V_{CE,sat} = 0 \\ R_{out} < 4^{K\Omega} \end{cases}$

$R_{out} = \dfrac{V_{cc}}{I_c} < 4^K \implies I_c > \dfrac{V_{cc}}{4^K} = \dfrac{8}{4^K} = 2^{mA}$ ⟶ انتخاب ⟶ $I_c = 4^{mA}$

$R_c = \dfrac{V_{cc} - V_{ce,sat}}{I_c} = \dfrac{8 - 0}{4} = 2^K$ ⟶ فرض $\beta = 100$ ⟶ $I_B > \dfrac{I_c}{\beta_{min}} = \dfrac{4}{100} = 0.04 = 40^{\mu}$

$\implies R_B = \dfrac{V_{cc} - V_{be,on}}{I_B} = \dfrac{7.3}{40^{\mu A}} = 182.5^K$ ⟶ انتخاب ⟶ $\begin{cases} R_c = 2^K \\ R_B = 200^K \end{cases}$

$T_2 = PW = Z_2 \ln\left[\dfrac{-2V_{cc} + V_{be,on} + V_{ce,sat}}{-V_{cc} + V_{be,on}}\right]$, $Z_2 = R_B C_2$ $\xrightarrow{f = 10^{KHZ}}$ $T = \dfrac{1}{f} = \dfrac{1}{10^K} = 100^{\mu s}$

$PW = T_2 = 0.4 T = 40^{\mu S}$ $\implies$ $40^{\mu S} = 200^K \times C_2 \ln\left[\dfrac{-2(8) + 0.7}{-8 + 0.7}\right]$ $\implies C_2 = 270^{PF}$

$T_1 = L - PW = Z_1 \ln\left[\dfrac{-2V_{cc} + V_{be,on} + V_{ce,sat}}{-V_{cc} + V_{be,on}}\right]$, $Z_1 = R_B C_1$ $\implies T_1 = T - 0.4 T = 0.6 T$
$= 60^{\mu S}$

$\implies 60^{\mu S} = 200^K C_1 \ln\left[\dfrac{-2(8) + 0.7}{-8 + 0.7}\right]$ $\implies C_1 = 400^{PF}$ ⟶ انتخاب ⟶ $C_1 = 390^{PF}$

34-8

$\begin{cases} V_{cc} = 9^V \\ I_L = 50^{\mu A} \\ PW = 100^{\mu S} \\ \text{مقدار ترانزیستورها} \end{cases}$
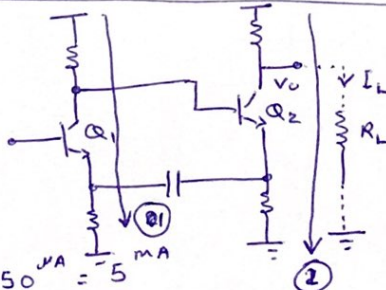
$I_c \gg I_L \implies I_c = 100 I_L = 100 \times 50^{\mu A} = 5^{mA}$

KVL ①: $V_{cc} = R_{c_1} I_{c_1} + V_{ce,sat} + R_{E_1} I_{E_1}$, $V_{B_2} = V_{be,on} + R_{E_1} I_{E_1}$

KVL ②: $V_{cc} = R_{c_1} I_{B_1} + V_{be,on} + R_{E_2} I_{E_2}$

$$\underrightarrow{I_c \approx I_E = 5^{mA}}$$

$V_{CE,sat} = 0.2$

$V_{bc,ON} = 0.7$

$\beta = 100$

$R_{E_1} = R_{E_2}$

$$\begin{cases} R_{C_1} + R_E = 1.76 \\ V_{B_2} - 5R_E = 0.7 \\ 100R_E + R_{C_1} = 166 \end{cases} \Rightarrow \begin{cases} R_E = 1.6^k \\ R_{C_1} = R_{C_2} = 150^k \\ V_{B_2} = 8.7^v \end{cases}$$
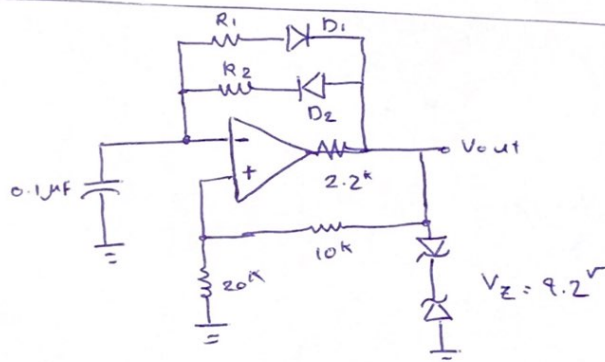
$$T_2 = R_{E_2} \ln\left[\frac{V_{CC} - 2V_{bc,ON}}{(V_{B_2} - V_{BE}) + V_{CE,sat}}\right] \cdot C \Rightarrow 100^{\mu s} = 1.6^k \times C \times \ln\left[\frac{9 - 2(0.7)}{8.7 - 0.7 + 0.2}\right]$$

$$\Rightarrow \underline{C = 822^{nF}} \xrightarrow{\text{استاندارد}} 820^{nF}$$

36-8

$$\begin{cases} D.C = 5\% \\ f = 200^{HZ} \rightarrow T = \frac{1}{200} \end{cases}$$

$$T_H = R_2 C \ln\left[1 + 2\frac{R_g}{R_f}\right]$$
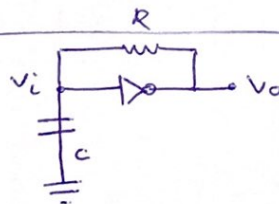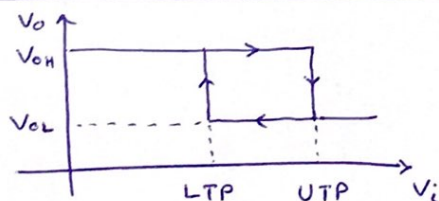
$$T_L = R_1 C \ln\left[1 + 2\frac{R_g}{R_f}\right]$$

$$D.C = \frac{T_H}{T_H + T_L} = \frac{R_2}{R_1 + R_2} \times 100 \Rightarrow T = T_H + T_L = (R_1 + R_2) C \ln\left[1 + 2\frac{R_g}{R_f}\right]$$

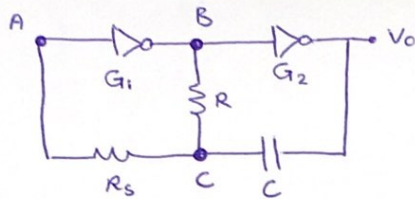$$\Rightarrow f = \frac{1}{T} = \frac{1}{(R_1 + R_2) C \ln\left[1 + 2\frac{R_g}{R_f}\right]} \Rightarrow \begin{cases} R_1 = 19 R_2 \\ R_1 + R_2 = 31^k \end{cases} \Rightarrow \begin{array}{c} R_1 = 29.45^k \\ R_2 = 1.55^k \end{array}$$

استاندارد: $\begin{cases} R_1 = 30^k \\ R_2 = 1.5^k \end{cases}$

40-8

42_8

if V_0: logic $\underline{0}$ $\longrightarrow$ B: logic $\underline{1}$ $\longrightarrow$ A: logic $\underline{0}$ $\longrightarrow$ $\Delta\bar{V}_{AC} = R_s I_{G_1}$

تغییر منطق
نیروی ورودی : $V_C = V_T + R_s I_{G_1}$ $\xrightarrow[\text{از 0 به 1}]{\text{پایش منطق نیروی}}$ $V_C(0^+) = V_T + R_s I_{G_1} + V_{CC}$
بعد

$\tau = (R \| R_s) . C$ $\longrightarrow$ با افزایش R_s وابستگی مُباش به دلتا آستانه
کم می شود