Caso 1

$T_1 = 30\%$

$T_2 = 70\%$

$T = T_1 + T_2$ = Periodo Total

$F = \frac{1}{T} = \frac{1}{(T_1 + T_2)}$

$T = \frac{1}{F}$

$T_1 = 0.693(R_1+R_2)C_1$

$T_2 = 0.693 * R_2 * C_1$

$F = 1\ KHz$

$T = \frac{1}{1 \times 10^{3}} = 1 \times 10^{-3}\ s$

$T_1 = 30\%$

$T = 1\times10^{-3}\ s$ — 100%

T_1 — 30%

$T_1 = 3\times10^{-4}\ s$

$T = 1\times10^{-3}\ s$ — 100%

$T_2 =$ — 70%

$T_2 = 7\times10^{-4}\ s$

Con un Capacitor 1

$C_1 = 100\ nF$

Para T_1

$T_1 = 3\times10^{-4}\ s = 0.693(R_1+R_2)(100nF)$

$T_2 = 7\times10^{-4}\ s = 0.693 * R_2 * (100nF)$

$R_2 = \frac{7\times10^{-4}\ s}{0.693(100nF)} = 10{,}101.0101\ \Omega$

Normalizanzo R_2

R_2 menor $= 10\ K\Omega$

R_2 mayor $= 11\ K\Omega$

R_2 menor

$T_2 = 0.693 * (10K\Omega) * (100nF) = 6.93\times10^{-4}\ s$

Diferencia $= 7\times10^{-4}\ s - 6.93\times10^{-4}\ s = 7\times10^{-6}\ s$

$T_2 = 7\times10^{-4}\ s$ — 100%

$T_{2me} = 7\times10^{-6}$ — X

$X = 1\%$

R_2 mayor

$T_2 = 0.693(11K\Omega) * (100nF) = 7.623\times10^{-4}\ s$

Diferencia $= 7\times10^{-4}\ s - 7.623\times10^{-4}\ s = 6.23\times10^{-5}$

$T_2 = 7\times10^{-4}\ s$ — 100%

$T_2 = 6.23\times10^{-5}$ — x $\quad x = 8.9\%$

Por lo tanto tomamos R_2 menor $= 10\ K\Omega$

$T_1 = 3\times10^{-4}\ s = 0.693(R_1+R_2)C_1$

$R_1 = \frac{3\times10^{-4}\ s}{0.693(100nF)} - 10K\Omega = -5{,}670.99\ \Omega$

Normalizando R_1

R_1 menor $= 5.6\ K\Omega$

R_2 mayor $= 6.2\ K\Omega$

Con R_1 menor $= 5.6\ K\Omega$

$T_1 = 0.693[R_1+R_2]C_1$

$T_1 = 0.693[(-5.6k\Omega)+(10K\Omega)](100\times10^{-9}\ F)$

$\cancel{T_1 = 1.08108\times10^{-3}\ s}$ $T_1 = 3.0492\times10^{-4}$

$\cancel{\text{Diferencia} = 3\times10^{-4}\ s - 1.0810\times10^{-3}}$

$\cancel{= -7.81\times10^{-4}\ s}$

$\cancel{T_1 = 3\times10^{-4}\ s — 100\%}$

$\cancel{T_1 = 7.81\times10^{-4} — X}$

$X =$

Diferencia $= -4.92\times10^{-6}$

$T_1 = 3 \times 10^{-4}$ s — 100 %

$T_1 = \cancel{3 \ldots}$

-4.92×10^{-6} s — x

$x = 1.64\%$

Con R_1 mayor

$T_1 = 0.693(6.2\,K\Omega + 10\,K\Omega)(100\,nF) = \cancel{1.1226 \times 10^{-3}}$ s $= 2.6334 \times 10^{-4}$ s

Diferencia $= 3 \times 10^{-4}$ s $- 2.63 \times 10^{-4}$

Diferencia $= 3.666 \times 10^{-5}$ s

~~$T_1 = 2.634 \times 10$~~

$T_1 = 3 \times 10^{-4}$ — 100 %

3.66×10^{-5} — x $\quad x = 12.22\%$

Por lo tanto aplicamos R_1 menor $= 5.6\,K\Omega$

Escaneado con CamScanner

18/03/2022

Caso 3

$T_1 = 49.5\ \%$

$T_2 = 50.5\%$

1. $f = 3.5KHz \quad c = 3.6\mu f$

$T_1 = \frac{1}{3.5KHz} = 2.85\times10^{-4}\ s$

$T_1 = 0.693(R_1+R_2)C_1$

$T_2 = 0.693(R_2)C_1 =$

$T = 2.85\times10^{-4}\ s$ — 100%
— 49.5%

$T_1 = x$

$T_1 = 1.4142\times10^{-4}\ s$

$T = 2.85\times10^{-4}\ s$ — 100%
— 50.5%

$T_2 = x$

$T_2 = 1.4392\times10^{-4}\ s$

$R_2 = \frac{1.4392\times10^{-4}\ s}{0.693(3.6\times10^{-6})} = 57.68\ \Omega$

R_2 menor $= 56\ \Omega$

R_2 mayor $= 62\ \Omega$

con R_2 menor

$T_2 = 0.693(56)(3.6\times10^{-6})$

$T_2 = 1.397\times10^{-4}\ s$

Diferencia $= 4.22\times10^{-6}\ s$

1.4392×10^{-4} — 100%

4.22×10^{-6} — x

$x = 2.9321\%$

con R_2 mayor

$T_2 = 0.693(62)(3.6\times10^{-6}) = 1.5467\times10^{-4}$

Diferencia

$1.4392\times10^{-4} - 1.5467\times10^{-4} = 1.07576\times10^{-5}$

$1.4392\times10^{-4}\ s$ — 100%

1.07576×10^{-5} — x

$x = 7.47\%$

Usamos R_2 menor porque su tolerancia es menor.

Calculando T1

$T_1 = 0.693(R_1+R_2)C_1$

$R_1 = \frac{1.4142\times10^{-4}}{0.693(3.6\times10^{-6})} - (56\Omega)$

$R_1 = 0.685\ \Omega$

R_1 menor $= 0.68\ \Omega$

R mayor $= 0.82\ \Omega$

*Con R_1 menor $= 0.68\ \Omega$

$T_1 = 0.693(R_1+R_2)C_1$

$T_1 = 0.693(0.68+56\Omega)(3.6\mu f)$

$T_1 = 1.4140\times10^{-4}$

Diferencia $= 1.4142\times10^{-4} - 1.4140\times10^{-4}$

$= 2\times10^{-8}\ s$

$T_1 = 1.4142\times10^{-4}$ — 100%

2×10^{-8} — x

$x = 0.0141\%$

Con R_1 mayor $= 0.82\ \Omega$

$T_1 = 0.693(0.82+56\Omega)(3.6\times10^{-6})$

$T_1 = 1.4175\times10^{-4}$

Diferencia $= 1.4142\times10^{-4} - 1.4175\times10^{-4}$

$= -3.3\times10^{-7}$

Tol % $= 0.2304\%$

Se usa R_1 menor porque su tolerancia es menor