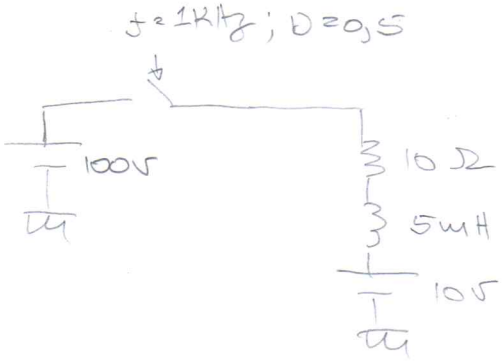


$\tau = \frac{L}{R} = 0{,}0005$ sec

i)

$D = 0{,}5$

$\therefore \langle V_o \rangle = D V_i$

$= 0{,}5 \times 100$

$= 50$ Volt

$\langle i_o \rangle = \frac{\langle V_o \rangle - E}{R}$

$= \frac{50 - 10}{10} = 4A$

$$I_{min} = \frac{V_i}{R} \times \frac{e^{\frac{t_{on}}{\tau}} - 1}{e^{\frac{T}{\tau}} - 1} - \frac{E}{R}$$

$\frac{t_{on}}{\tau}$

< 0 condução descontínua

> 0 condução contínua

$\frac{t_{on}}{\tau} = 0{,}005$

1kHz ; 10

$$I_{min} = \left(\frac{V_i}{R}\right) \times \frac{e^{\frac{t_{on}}{\tau}} - 1}{e^{\frac{T}{\tau}} - 1} - \left(\frac{E}{R}\right) \quad ; D = 0{,}5$$

$\frac{T}{\tau}$: $T = \frac{1}{1000}$, $\tau = 0{,}0005$

$\frac{E}{R} = 1$

$\frac{V_i - E}{R} = 9$

$\langle V_o \rangle = 50V$; $\langle i_o \rangle = 4A$ $\quad i_f = 2A$

$I_{min} = 1{,}68941$ A > 0

$I_{max} = 6{,}31058$ A

ii) 100 khz

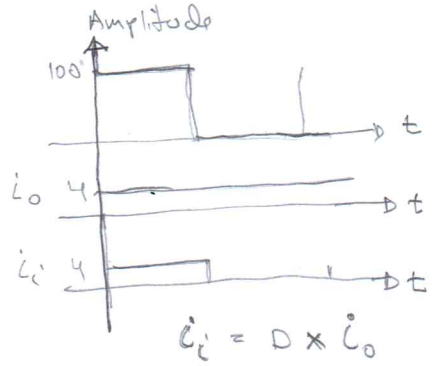
$D = 0,5$; $\frac{V_i}{R} = 10$; $\frac{E}{R} = 1$; $\frac{V_i - E}{R} = 9$; $T = \frac{1}{100000}$

$L = 0,0005$; $t_{on} = 0,000005$

$\langle V_{o\,med} \rangle = 50\ V$ $\quad I_{min} = 3,975\,00 > 0$

$\langle I_{o\,med} \rangle = 4\ A$

$I_f = 2\ A$ $\quad I_{máx} = 4,02499$



como $I_{min} \tilde{=} I_{máx}$

$$\Rightarrow P_o = \frac{1}{T}\int_0^T V_o\, I_o^{*K}\, dt$$

$$= I_o \times \frac{1}{T}\int_0^{\frac{T}{2}} V_o\, dt$$

$$= I_o \times \frac{V_o}{2} = 4 \times \frac{100}{2} = 200\ W$$

$$P_i = \frac{1}{T}\int_0^T V_i^{*K}\, i_i\, dt$$

$$= V_i \times \frac{1}{T}\int_0^{\frac{T}{2}} i_i\, dt = 100 \times \frac{i_i}{2}$$

$$= 100 \times \frac{4}{2} = 200\ W$$

iii) 100 Hz

$D = 0,5$; $\frac{V_i}{R} = 10$; $\frac{E}{R} = 1$; $\frac{V_i - E}{R} = 9$; $T = \frac{1}{100}$

$\tau = 0,0005$; $t_{on} = 0,005$

$I_{min} = -0,99954\ A \quad < 0 \quad \therefore I_{min} = 0$

$I_{masc} = 8,99954\ A$

$T_c = 0,006151$

$\langle V_{omed} \rangle = 53,848\ V$

$\langle I_{omed} \rangle = 4,38487\ A$

$t_{on} = 0,008848$; $I_{min} = 0$

$I_{min} < 0$

$$I_{masc} = \frac{V_i - E}{R} \times \left(1 - e^{-\frac{t_{on}}{\tau}}\right)$$

$$t_c = t_{on} + \tau \ln\left[1 + \frac{V_i - E}{R}\left(1 - e^{-\frac{t_{on}}{\tau}}\right)\right]$$

$$\downarrow$$

$$\langle V_o \rangle = D V_i + \left(\frac{T - t_c}{T}\right) \cdot E$$

$$= 53,8\ V$$

$$\langle i_o \rangle = 4,38\ A$$