E) $P_c = \frac{(J_0 m_f E_c)^2}{2 Z_L} = \frac{((-0,4) \cdot 4 \cdot 10)^2}{2 \cdot 50\Omega} = 2,56\ W$

F) $P_c = \frac{(J_0 m_f E_c)^2}{2 \cdot Z_L}$ si no module $\Rightarrow J_0 = 1$ $\therefore P_c = \frac{(1 \cdot 4 \cdot 10)^2}{2 \cdot 50\Omega} = 16\ W$

otros.

$B_{FM\ Bessel} = 2n \cdot f_m = 2 \cdot 7 \cdot 10^4 t = 140\ kHz$

$B_{FM\ Carson} = n = m_f + 1 = 4 + 1 = 5$

$2 \cdot 5 \cdot 10^4 t = 100\ kHz$ Cuanta potencia tenga en 100 kHz

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4.18

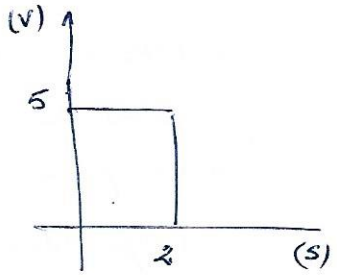
$5\ MHz \Rightarrow 50\ MHz$

$\Delta f_c = 4\ kHz. \quad 40\ kHz.$

$5\ MHz \rightarrow [\times 10] \rightarrow 50\ MHz.$

$\Delta f_c\ 4\ kHz \rightarrow [\times 10] \rightarrow 40\ kHz.$

4.20



$$\phi_{FM} = E_c \cdot \operatorname{Sen} \phi_i$$

$$\frac{d\phi_i}{dt} = w_i = w_c + k f(t)$$

$$\phi_i = w_c t + k \int f(t)\, dt.$$

$$\phi_i = E_c \cdot \operatorname{Sen}\left(w_c t + k \int f(t) \cdot dt\right)$$

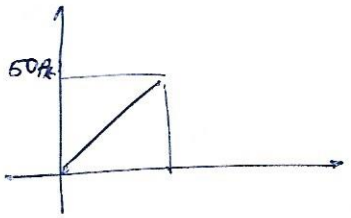
$$\phi_i = 40 \cos\left[2\pi 10^4 t + 2\pi k \int m(t)\, dt\right]$$

$$v(t) = 40 \cos\left[2\pi 10^4 t + 2\pi k \int_0^T m(t)\, dt\right]$$

$$k = 10 \frac{Hz}{V} \qquad \Delta f_c = 50\,Hz.$$

$$= 2\pi 10^4 t + 2\pi k \int_0^2 5\, dt = 2\pi 10^4 t + 10\pi 10 \int_0^2 dt.$$

A) $\phi_i = 2\pi 10^4 t + 200\pi$



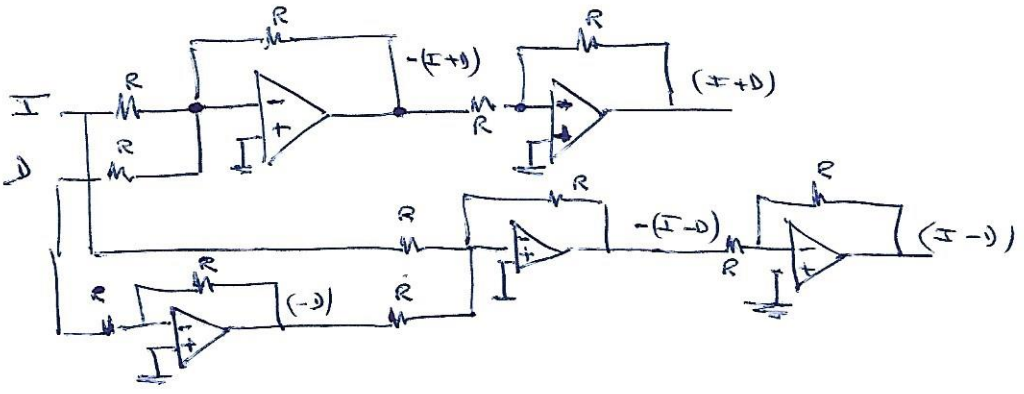
B) $\Delta f_c = E \cdot K = 5V \cdot 10 \frac{Hz}{V} = 50\,Hz.$

C) $f_{max} = f_c + \Delta f_c = 10K + 50\,Hz.$

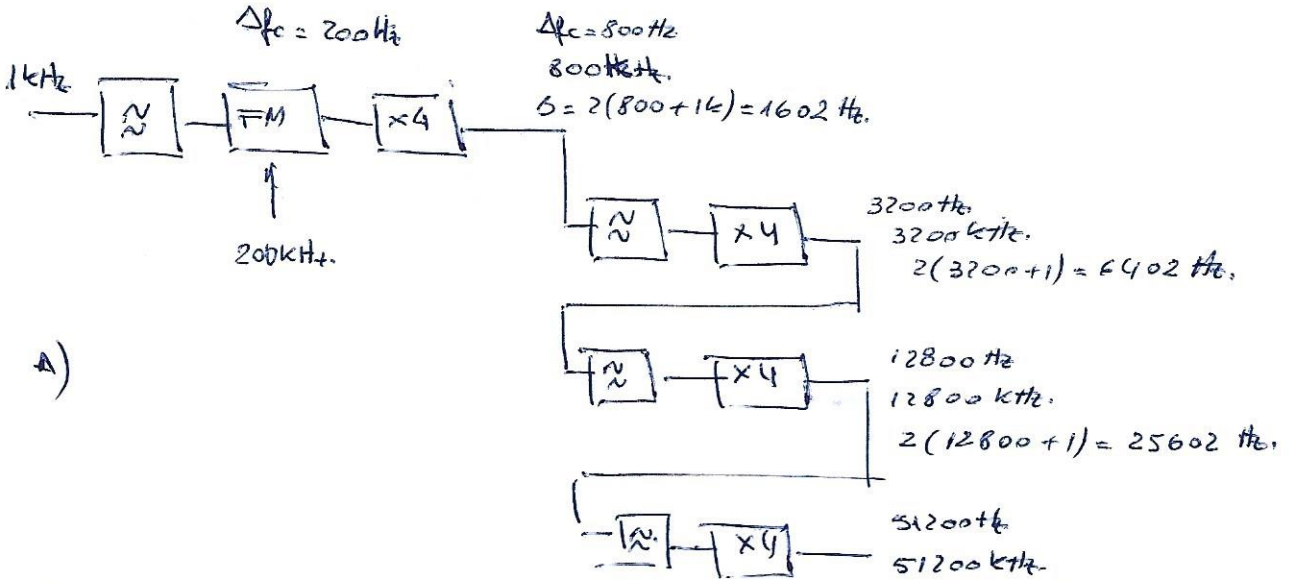
$f_{min} = f_c - \Delta f = 10k - 50\,Hz$

D) $P_T = \frac{E_c^2}{2R_2} = \frac{40^2}{2.1\Omega} = 800\,W$

4.24



4.23



A)

B) 51,2 kHz.

1602 Hz
6402 Hz
25602 Hz.
102402 Hz.

4.25