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1) a) $V_{\text{medio}} = 0 \text{ V}$

$$V_{\text{S}} \frac{\text{pico}}{\text{carga}} = \frac{180}{2} - 1 \rightarrow 89 \text{ V}$$

$$V_{\text{rms}} = \frac{89}{\sqrt{2}} \sqrt{1 - \frac{\pi/3}{\pi} + \frac{\sin(2\pi/3)}{2\pi}}$$

$$V_{\text{rms}} = \underline{56,44 \text{ V}}$$

b) $P = \frac{V_{\text{rms}}^2}{R} \rightarrow \frac{56,44^2}{50} = 63,7 \text{ W}$

2a) $\left(\frac{70 - 25}{10} \right) \cdot 100 \rightarrow P = 450 \text{ mW}$

$$P = \frac{V_{\text{rms}}^2}{R} \rightarrow V_{\text{rms}} = \sqrt{450 \cdot 50} \rightarrow 67,08 \text{ V}$$

$$V_{\text{rms}} = V_{\text{S}} \cdot \sqrt{k} \rightarrow \left(\frac{67,08}{127} \right) \rightarrow k = 0,279$$

$k = 27,9\%$

b) $V_{\text{rms}} = V_{\text{S}} \left[1 - \frac{\alpha}{\pi} + \frac{\sin 2\alpha}{2\pi} \right]^{1/2}$

$$67,08 = 127 \left[1 - \frac{\alpha}{\pi} + \frac{\sin 2\alpha}{2\pi} \right]^{1/2}$$

$$\left(\frac{67,08}{127} \right)^2 = 1 - \frac{\alpha}{\pi} + \frac{\sin 2\pi}{2\pi}$$

$$\alpha = 1,93 \text{ rad ou } 110^\circ$$

$$\alpha = 1,93 \text{ rad } \alpha = 110,8^\circ$$

P/vo

3

$$V_i = 380V$$

$$\alpha = \pi/3$$

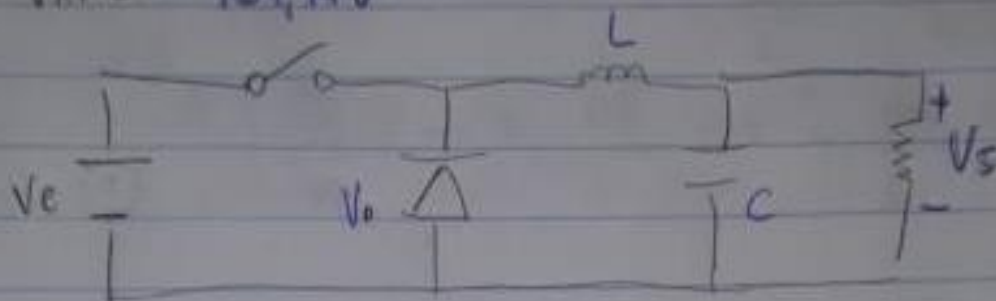
$$V_s = 220V$$

$$330$$

$$V_{RMS} = \sqrt{6} V_s \left[\frac{1}{12} + \frac{3 \cdot \sin(\pi/3)}{16\pi} + \frac{\sqrt{3} \cdot \cos(\pi/3)}{16\pi} \right]^{0.5}$$

$$V_{RMS} = 184,94V$$

4a



B) $V_{med} = d \cdot V_c \Rightarrow V_{med} = 0,7 \cdot 220$
 $V_{med} = 154V$

5a



* Chopper Boost

$$V_s = 5V$$

$$V_{out} = 15V$$

$$I_{out} = 0,5A$$

$$f_{ch} = 25kHz$$

B) $V_{out} = \left(\frac{V_{in}}{1-K} \right) \Rightarrow$ Conv. Boost

$$(1-K) = \left(\frac{V_{in}}{V_{out}} \right) \Rightarrow K = 1 - \left(\frac{V_{in}}{V_{out}} \right) \Rightarrow K = 66,6\%$$

c) Como P/F.P.B de 2º Ordem temos:

$$f_{corte} = \frac{1}{2\pi \cdot \sqrt{L \cdot C}}$$

$$L = \left[\frac{1}{(2\pi f_c)^2 \cdot C} \right] \Rightarrow L = 25,3mH$$