Universidade Federal do Rio de Janeiro
Escola Politécnica

DATA: 25/11/2019

GRAUS

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Aluno: Gabarito da Prova Parcial #2

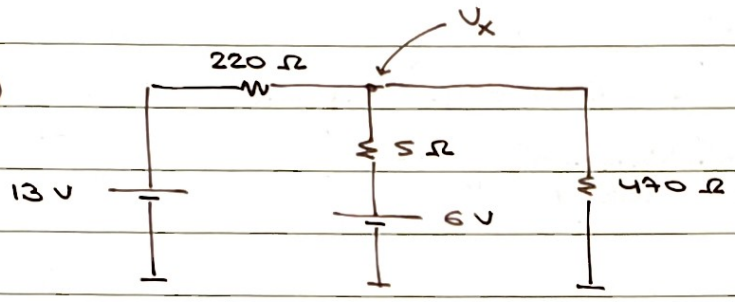
Disciplina: Eletrônica I

Turma: 2019-2

Professor: José Gabriel

Questão (1)

a)



$$\frac{13 - V_x}{220} = \frac{V_x - 6}{5} + \frac{V_x}{470}$$

$$V_x(220\times470 + 220\times5 + 5\times470) = 13\times5\times470 + 6\times220\times470$$

$V_x = 650950/106850 = 6.09$ V

Para 17 V: $V_x = (17\times5\times470 + 6\times220\times470)/106850 = 660350/106850 = 6.18$ V

(Obs.: fator de ripple $r_{RL} = (6.18 - 6.09)/(2\sqrt{3}\times6.135) = 0.42\%$)

b) No capacitor: $r_{cap} = (17 - 13)/(2\sqrt{3}\times15) = 7.7\%$

No resistor de carga: $r_{RL} = 0.077\times(5/225)\times15/6.2 = 0.41\%$

(assumindo que o diodo Zener é de 6.2 V, ou seja, $V_z = 6.2$ V)

c) Quando $R_L = 220\ \Omega$ e $V_{capacitor} = 13$ V, temos $(13 - V_x)/220 = (V_x - 6)/5 + V_x/220$, ou seja, $(220 + 10)V_x = 13\times5 + 6\times220$, então $V_x = 6.02$ V e portanto

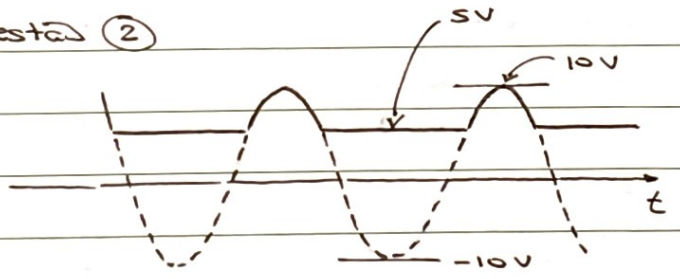
$I_{Zmin} = (6.02 - 6)/5 = 4$ mA

Quando $R_L \to \infty$ e $V_{capacitor} = 17$ V, temos $I_{Zmax} = (17 - 6)/225 = 49$ mA

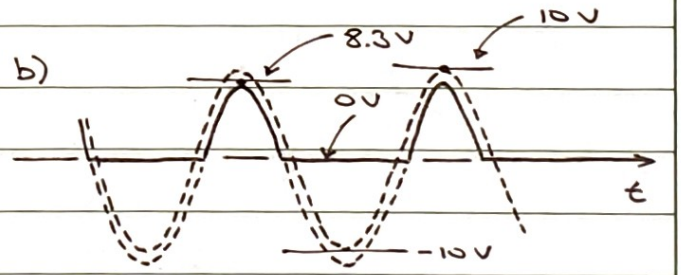
(obs.: $V_x = 6 + 5\times0.049 = 6.25$ V)

Questão (2)

a)

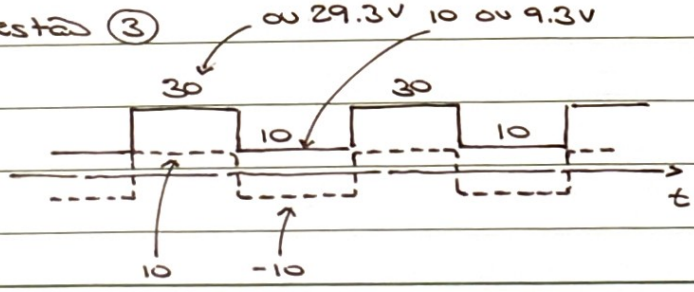


b)

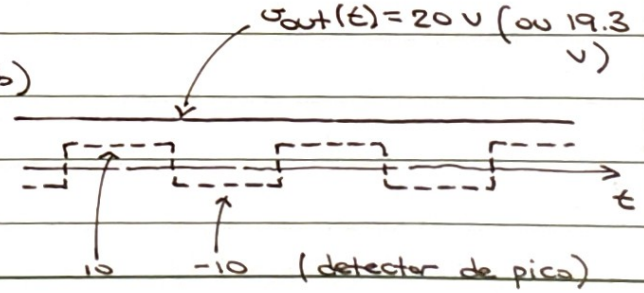


Questão (3)

a)



b)



Questão (4)

$V_{out} = 20\,V - 2 \times 1.4\,V \implies V_{out} = 18.6\,V$ /h

Questão (5)

a) $V_+ = V_2/2 = 2\,V$

$A \to \infty$, então $V_- = 2\,V$

$V_{out} = V_- + \underbrace{(V_- - V_1)}_{0\,V} \longrightarrow V_{out} = 2\,V$ /h

b) $V_+ = V_2/2 = 2\,V$

$A = 100$, então $V_{out} = 100(V_+ - V_-)$

$2 - V_- = V_{out}/100 \longrightarrow V_- = 2 - V_{out}/100$

$V_{out} = V_- + (V_- - V_1) = 2 - \frac{V_{out}}{100} + 2 - \frac{V_{out}}{100} - 2$

$V_{out}\left(1 + \frac{2}{100}\right) = 2$

$V_{out} = 2/1.02 = 1.96\,V$ /h

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