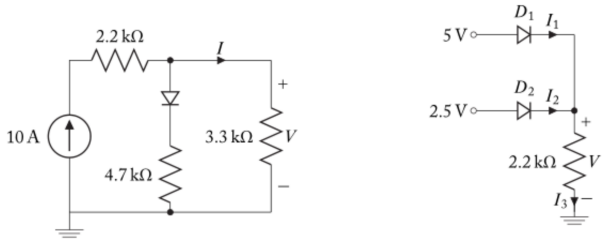
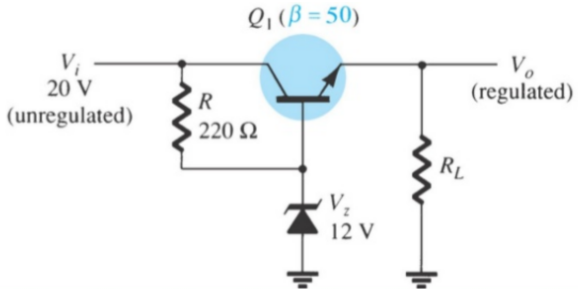
P1 2019.1 Dispositivos Eletrônicos Prof. Marcelo Perotoni

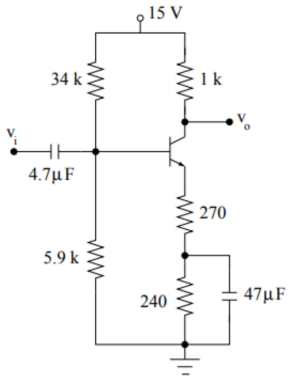
[1] **(a)** Calcule a tensão V e a corrente I no circuito da esquerda. Considere o diodo como sendo ideal. **(b)** Para o circuito da direita, calcule I_1, I_2, I_3, e V, considerando o diodo ideal.



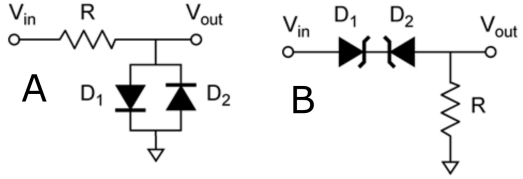
[2] O circuito regulador possui a capacidade de boost de corrente adicional devido ao transistor. Considere o transistor ativo, com $V_{BE} = 0.7$V e resistor de carga de 1K. **(a)** Calcule a corrente que passa no zener. Despreze a corrente de base. **(b)** Qual o valor de V_O? **(c)** Calcule a corrente de coletor no transistor. **(d)** Ao retirar o resistor de carga, o zener queima? O que acontece?



[3] **(a)** Calcule a corrente quiescente I_{cq} , I_B and V_{CE} do transistor para $\beta = 200$. Considere V_{BE} igual a 0.7. Realize a análise exata - com modelo Thevenin do circuito da base.

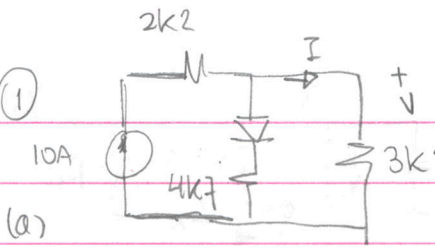


[4] Desenhe a forma de onda de saída para os circuitos A e B. Considere no A os diodos com 0.7 V para condição ON e no B zeners de 5V, com 0.7 V para polarização direta. Suponha sinal entrada senoidal, oscilando entre +10 e -10 Volts.



P1 - DISPOSITIVOS - 2019.1 (outra)

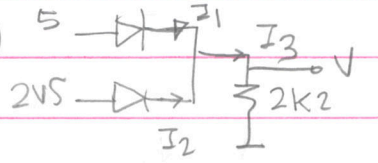
① (a)

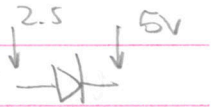


$I = 10 \times 4.7/(4.7+3.3) = 5.87A$

$V = 3.3K \times 5.87 = 19.38 kV$

(b)



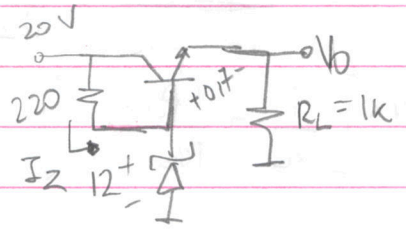


$I_2 = 0$ pois diodo OFF

$V = 5V$

$I_3 = I_1 = \frac{5}{2,2} mA = 2,27 mA$

②



(a) $I_Z = (20-12)/220 = 36.36 mA$

(b) $V_{out} = V_Z - 0,7 = 12 - 0,7 = 11,3V$

(c) $I_C = V_o/R_L = 11,3/1K = 11,3 mA$

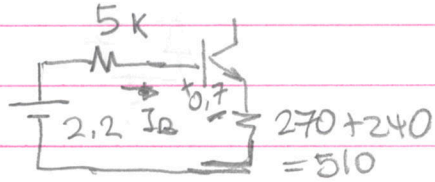
(d) Se carga transistor off não muda nada no Zener.

③

Thevenin:

$V_{BB} = 15 \cdot \frac{5.9}{5.9+34} = 2,2V$

$R_{BB} = 34K // 5.9K = 5k$



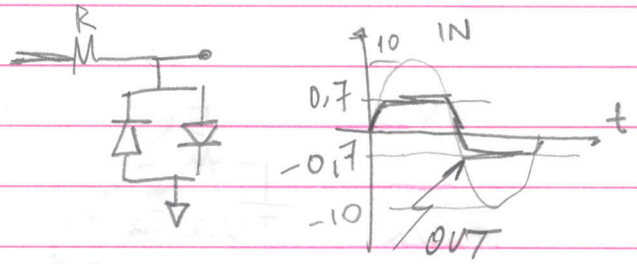
$2,2 - 0,7 = 5k \cdot I_B + 510 \beta I_B$

$I_B = \frac{2,2-0,7}{5K + 200 \cdot 510} = 14 \mu A$

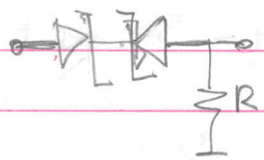
$I_C = \beta I_B = 200 \times 14 \mu A = 2.8 mA$

$V_{CE} = 15 - (1.51)(2.8) = 10,772$

4 (a)



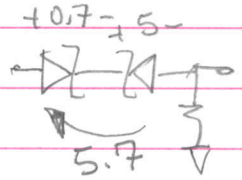
(b)



P/ $V_{IN} > 5.7$

diodos ON

$V_{out} = V_{IN} - 5.7$



P/ $V_{IN} < 5.7$

diodos abertos, $V_{out} = 0$