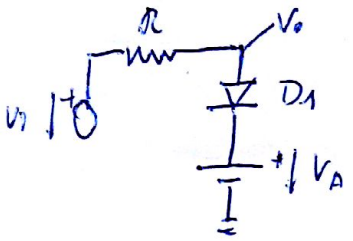
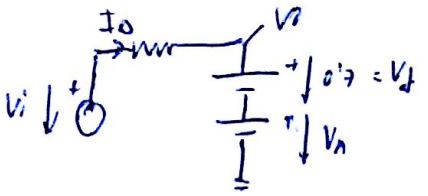
EJERCICIOS ELECTRÓNICA

⑥ $V_\gamma = 4\,V$ $I_{max} = 25\,mA$, $R = 1K\Omega$



a) Suponiendo D_1 on, $I_D = 0$



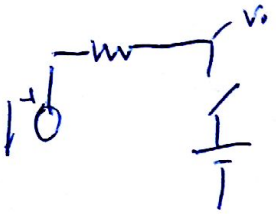
$V_i - I_D R - 0'7 - 4 = 0$

$\boxed{V_i = 4'7\,V}$

Si $V_i < 4'7 \rightarrow D_1$ off

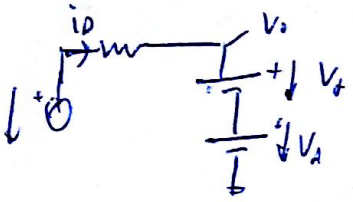
Si $V_i \geq 4'7 \rightarrow D_1$ ON

$V_i < 4'7 \rightarrow D_1$ off



$\Rightarrow \boxed{V_i = V_o}$

Si $V_i \geq 4'7 \rightarrow D_1$ ON



$$i_D = \frac{V_i - 0'7 - 4}{R}$$

$$V_o = V_i - I \cdot R = V_i - \frac{V_i - 0'7 - 4}{R} R =$$

$\boxed{V_o = 4'7}$

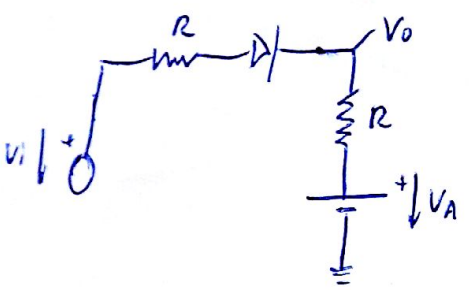
c) $i_D < 25mA$

$$i_D = \frac{V_i - 0'7 - 4}{R} < 25mA \Rightarrow V_i - 0'7 - 4 < 25mA \cdot 1K$$

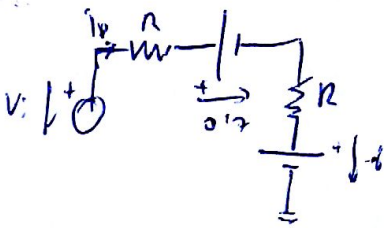
$V_i < 25 + 4'7 \Rightarrow \boxed{V_i \leq 29'7\,V}$

Si $V_i > 29'7 \rightarrow D_1$ Arde.

(7) $V_A = 6V$; $I_{max} = 25mA$, $R = 1k\Omega$



a) Suponiendo D_1 on, $I_D = 0$

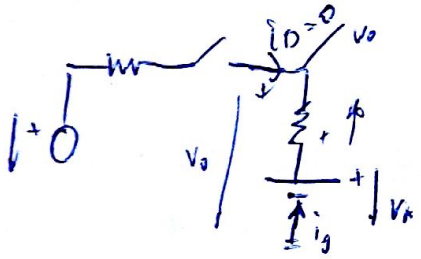


$V_i - i_D R - 0'7 - i_D R - 6 = 0$

$V_i = 6'7$

Si $\begin{cases} V_i \geq 6'7 \rightarrow D_1 \text{ ON} \\ V_i < 6'7 \rightarrow D_1 \text{ off} \end{cases}$

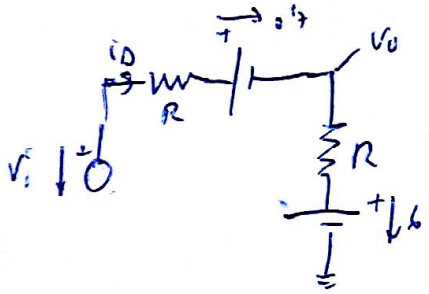
b) Si $V_i < 6'7 \rightarrow D_1$ off



$V_o = V_A =$

$\boxed{V_o = 6V}$

· Si $V_i \geq 6'7 \rightarrow D_1$ ON

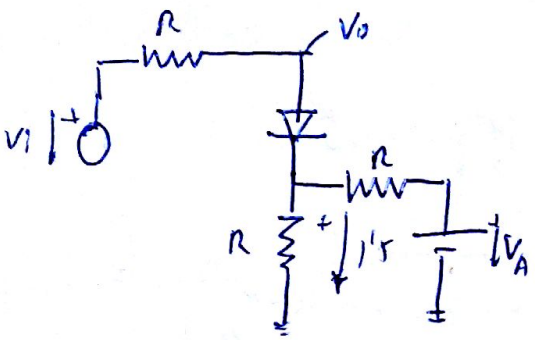


$i_D = \frac{V_i - 0'7 - 6}{2R} = \frac{V_i - 6'7}{2R}$

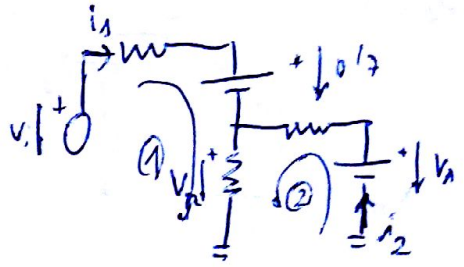
$V_o = i_D R + 6 = 6 + \frac{V_i - 6'7}{2R} \cdot R \Rightarrow$ ~~$V_o = V_i - 6'7$~~

$\boxed{V_o = \frac{V_i + 5'3}{2}}$

③ $V_A = 3V$



a) Suponemos D_1 ON, $I_{D_1} = 0$



$V_R = V_A \frac{R}{2R} = \frac{V_2}{2} = \frac{3}{2} = 1'5$

① $V_i - i_1 R - 0'7 - i_2 R = 0$ ($i_1 = 0$)

$V_i - 0'7 - i_2 R = 0 \Rightarrow V_i - 0'7 - \frac{V_A}{2R} R = 0$

② $V_A - i_2 R - i_2 R = 0$

$V_A - 2 i_2 R = 0$

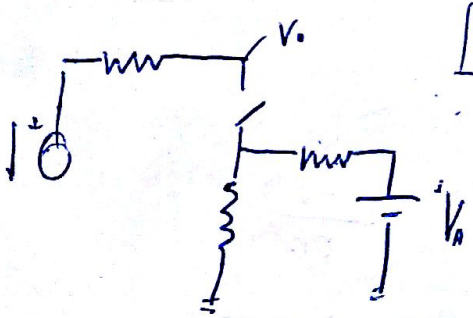
$i_2 = \frac{V_A}{2R}$

$V_i - 0'7 - \frac{3}{2} = 0$

$V_i = 2'2$

Si $V_i \geq 2'2 \rightarrow D_1$ ON
$V_i < 2'2 \rightarrow D_1$ off

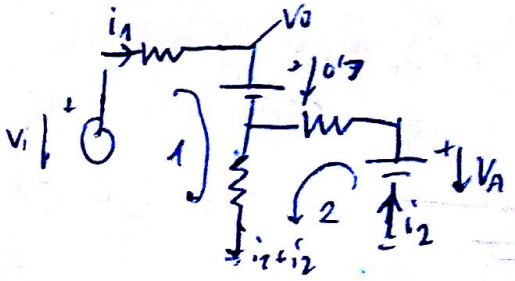
b) Si $V_i < 2'2 \rightarrow D_1$ off



$V_0 = V_i$

$V_0 = V_i - i_1 R$

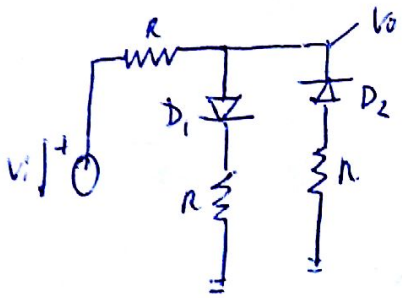
Si $V_i \geq 2'2 \rightarrow D_1$ ON



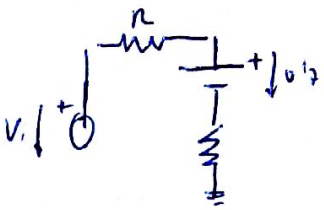
① $V_i - i_1 R - 0'7 - (i_1 + i_2) R = 0$

② $V_A - i_2 R - (i_1 + i_2) R = 0$ ⇒

(2)



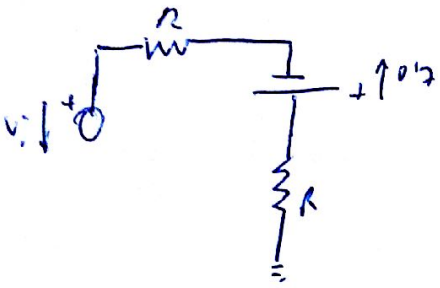
a) Supongo D_1 ON $\rightarrow i_D = 0$



$V_i - i_D R - 0'7 - i_D R = 0$

$V_i = 0'7$

Si $V_i \geq 0'7 \rightarrow D_1$ ON
$V_i < 0'7 \rightarrow D_1$ OFF

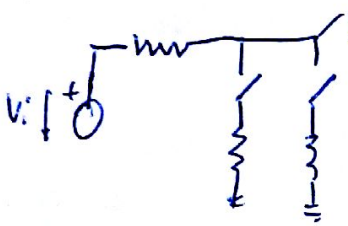


$V_i = i_D R - 0'7 + i_D R$

$V_i = -0'7$

Si $V_i \leq -0'7$ D_2 ON
$V_i \geq -0'7 \rightarrow D_2$ OFF

Hipótesis $\rightarrow$ D_1 D_2 OFF



$V_0 = V_i$

Comprobamos

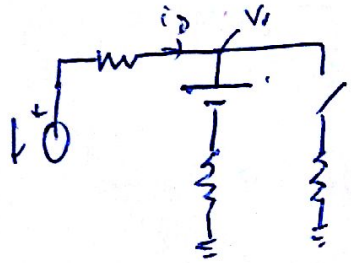
D_1 OFF $\rightarrow V_i < 0'7 \rightarrow$

D_2 OFF $\rightarrow V_i \geq -0'7$

Si $-0'7 < V_i < 0'7$ D_1 OFF D_2 OFF

Si $\rightarrow V_i \geq 0'7$ $D_1 \rightarrow$ ON

$D_2 \rightarrow$ OFF



$V_0 = 0'7 + i_D R \Rightarrow$ $V_0 = 0'7 + \frac{V_i - 0'7}{2R} R =$

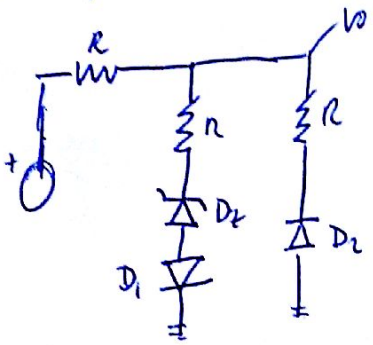
$V_i = i_D$ $i_D = \frac{V_i - 0'7}{2R}$

$V_0 = \frac{V_i + 0'7}{2}$

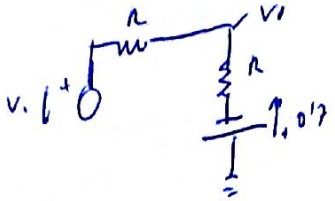
Si $V_i \leq -0'7$ D_1 OFF

V_i	D_1	D_2	V_1
$V_i \leq -0'7$	OFF	ON	$\frac{V_i - 0'7}{2}$
$-0'7 < V_i < 0'7$	OFF	OFF	V_i
$V_i \geq 0'7$	ON	OFF	$\frac{V_i + 0'7}{2}$

(8) $|V_z| = 7'5\,V$, $I_{max} = 100\,mA$, $P_{z,max} = 600\,mW$, $R = 1k\Omega$



a) Suponemos D_2 ON $I_D = 0$

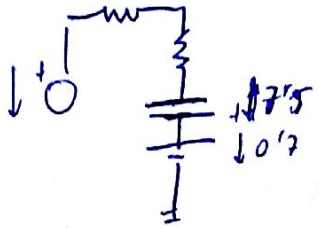


$V_i = I_D R - I_D R + 0'7 =$

$V_i = -0'7$

Si $V_0 \leq -0'7$ D_2 ON

$V_0 > -0'7$ D_2 OFF



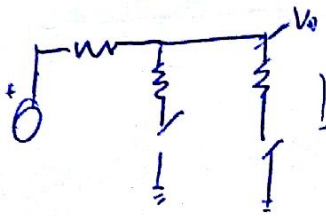
~~$V_i = -0'7 + 0'7 = 0'1$~~

$V_i = 7'5 + 0'7 = 8'2$

Si $V_0 \geq 8'2$ D_2 Ruptura D_1 ON

$V_0 < 8'2$ OFF OFF

HIPO D_1 OFF
D_2 OFF
D_2 OFF



$V_0 = V_i$

Comprobamos

D_2 D_1 OFF $\Rightarrow$ $V_0 < 8'2$

D_2 OFF $\Rightarrow$ $V_i > -0'7$ D_2 OFF

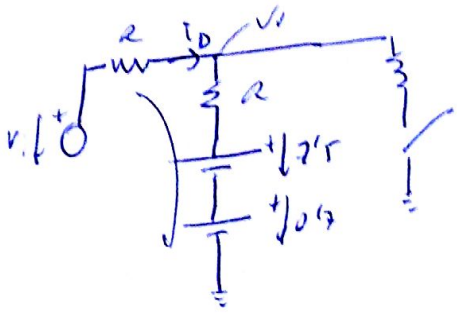
$-0'7 < V_i < 8'2$ D_1, D_2, D_2 OFF

$V_i < -0'7$ D_2 ON D_2 D_1 OFF

$V_i = -2i_D R - 0'7$

$i_D = \frac{-V_i - 0'7}{2}$

Si $V_i \geq 8'2 \rightarrow D_2$ RUPT D_1 ON
D_2 OFF



$$i_D = \frac{V_i - 7'5 - 0'7}{2R} = \frac{V_i - 8'2}{2R}$$

$$V_0 = V_i - i_D R$$

$$V_0 = V_i - \left(\frac{V_i - 8'2}{2R}\right) R = \frac{V_i + 8'2}{2}$$

$$\boxed{V_0 = \frac{V_i + 8'2}{2}}$$

V_i	D_1	D_2	D_3	V_0
$V_i < -0'7$	OFF	ON	OFF	~~$V_0 = V_i$~~ → $\frac{V_i - 0'7}{2}$
$-0'7 < V_i < 8'2$	OFF	OFF	OFF	V_i
$V_i \geq 8'2$	ON	OFF	RUPT	$\frac{V_i + 8'2}{2}$

b) Limitación Diodo → $I_D < 100mA$

$D_1 \rightarrow i_D = \frac{V_i - 8'2}{2R} < 100mA \Rightarrow V_i - 8'2 < 200$

$\boxed{V_i < 208'2V}$

$D_2 \rightarrow i_D = \frac{-0'7 - V_i}{2R} < 100mA$

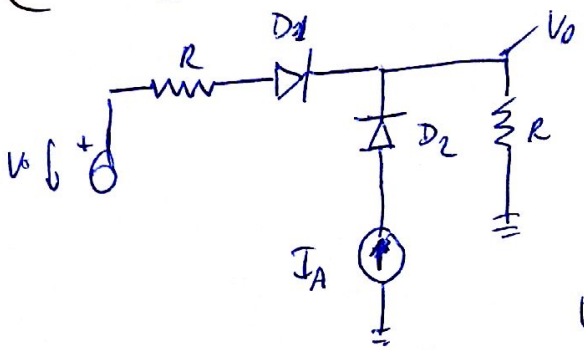
$-0'7 - V_i < 200 \Rightarrow \boxed{V_i > -200'7V}$ $\boxed{-200'7 < V_i < 208'2}$

~~$-V_i < 200 + 0'7$~~

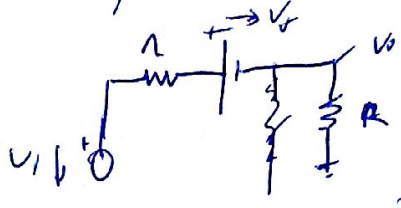
$V_i >$

$D_1 \rightarrow P_{máx} \rightarrow P = VI \Rightarrow I = \frac{P}{V} = \frac{600mW}{8'5V} = 80mA$

(11) $I_A = 25mA$ $R = 1k\Omega$



Suponemos D_1 ON, $I_D = 0$



$V_i - i_D R - 0'7 - i_D R = 0$

$V_i = 0'7$

Si $V_i \geq 0'7$ D_1 ON

$V_i < 0'7$ D_1 OFF

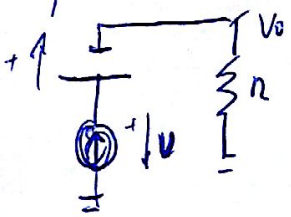
$V_i - 0'7 - V_o = 0$

$V_i - V_o = 0'7$

Si $V_i - V_o \geq 0'7$ D_1 ON

$V_i - V_o < 0'7$ D_1 OFF

Suponemos D_2 ON, $I_D = 0$

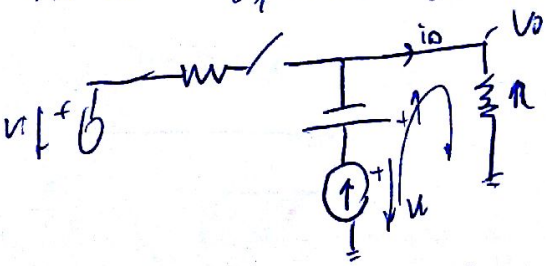


$u - 0'7 - V_o = 0$

Si $u - V_o \geq 0'7$ D_2 ON

$u - V_o < 0'7$ D_2 OFF

HIP 1. D_1 OFF. D_2 ON



$i_D = 2'5mA$

$i_D = \frac{u - 0'7}{R}$

$V_o = 2'5mA \cdot 1K\Omega = 2'5V$

$V_o = 0'7 + u$

Comprobar D_1 OFF → $V_i - V_o < 0'7$

$V_i - 2'5 < 0'7$

$V_i < 3'2$ V

HIP 2 $V_i \geq 3'2$ → D_1 ON

D_2 ON

$i_1 + i_A$ V_o $1K$ $1K$

$V_i - i_R R - 0'7 - (i_1 + i_A) R = 0$

$V_o = \left(\frac{V_i - 3'2}{2} + 2'5 \right) \cdot 1K$

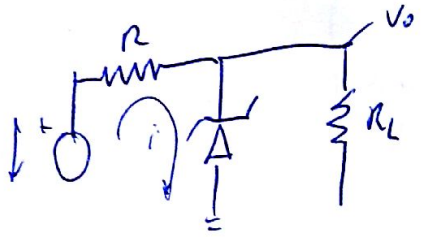
$V_i \geq 3'2$ → $V_o \geq 2'5$

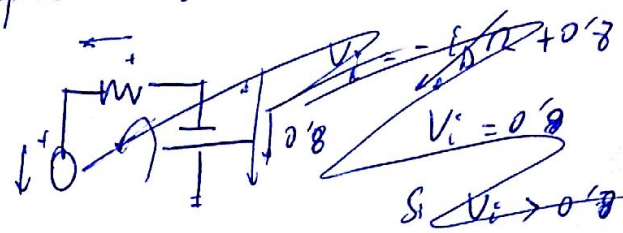
$V_i - V_o \geq 0'7$

V_i	D_1	D_2	V_o
$V_i \leq 3'2$	OFF	ON	2'5
$V_i \geq 3'2$	ON	ON	$(2'5 + \frac{V_i - 3'2}{2})$ 1kΩ

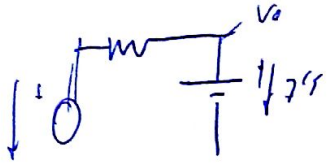
(9) $V_Z = 7'5$ $I_{Z,min} = 4mA$, $P_{Z\,max} = 600mW$, $R_L = 3k\Omega$ $R = 1k$

Suponemos D_Z ON, $V_D = 0$





Si ~~$V_i > 0'8$~~ ON



$V_i - i_D R - 7'5 = 0$

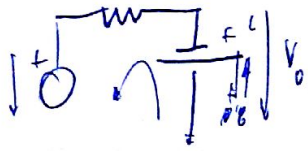
$V_i = 7'5$

$V_o \geq 7'5 \rightarrow D_Z$ RUPTURA

~~$V_i = -i_D R - 0'7$~~

$V_i \leq 0'8$ ON

$V_o \leq -0'8$

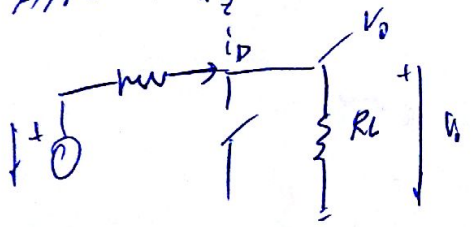


$V_o \leq -0'7$ ON

$-0'7 < V_o < 7'5$ OFF

$V_o \geq 7'5$ RUPT.

HIPO $\rightarrow$ D_Z OFF

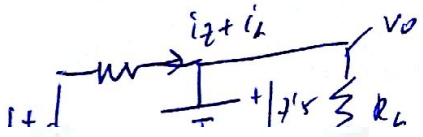


$V_o = V_i \frac{3}{3+1} = V_i \frac{3}{4} \Rightarrow \boxed{V_o = \frac{3}{4} V_i}$

D_Z OFF $\rightarrow$ $-0'7 < \frac{3}{4} V_i < 7'5$

$\boxed{-1'06 < V_i < 10}$

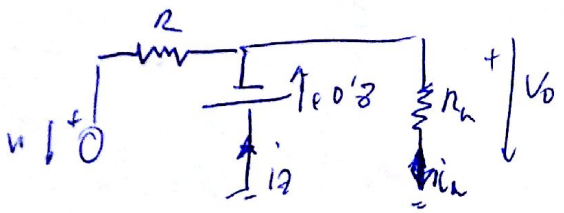
Si $V_i \geq 10 + V_o = 7'5$ Rupt.



$V_o = i R$ $\boxed{V_o = 7'5}$

i_2 ~~$+ i_1$~~ tiene que ser mayor que I_{Zmin}

Si $V_i \leq -1'06 \rightarrow V_0 \leq +0'7$ ON



$V_0 = -0'7$ $\quad V_0 = -i_L \cdot R \Rightarrow \quad i_L = -\frac{V_0}{R} = \frac{-0'7}{3} = 0'26$

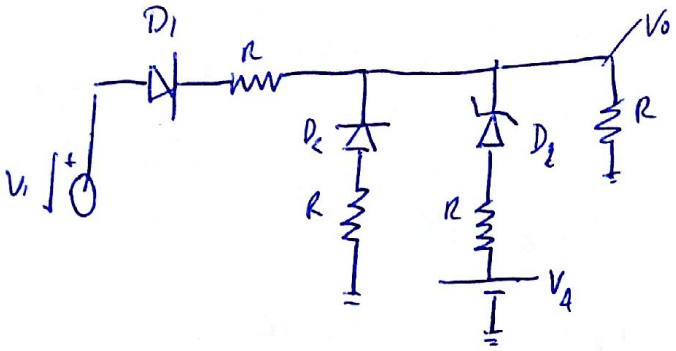
$V_i \quad 0 - 0'7 - (i_z + i_L)R = V_i$

$i_z = -V_i - 0'7 - 0'26$

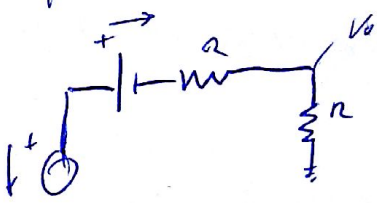
$i_z = -V_i - 1'06$

* Mirar en HOJAS

(13) $|V_z| = 5'6$



Suponemos D_2 ON, $I_D = 0$

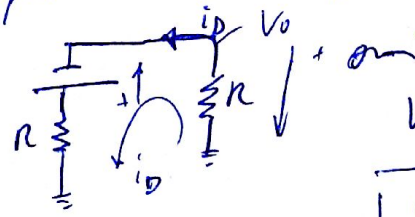


$V_i - 0'7 - I_D R - I_{D_2} R + V_o = 0$

$V_i - V_\theta = 0'7$

$D_1 \rightarrow$ Si $V_i \geq 0'7$ ON
$V_i < 0'7$ OFF

Suponemos D_2 ON $I_D = 0$

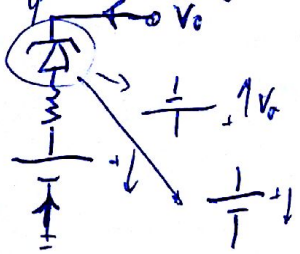


$V_o = -0'7 + i_D R$

$D_2 \rightarrow$ Si $V_o \leq -0'7$ ON
$V_o > -0'7$ OFF

$D_1 \rightarrow$ Si $V_i - V_o \geq 0'7$ ON
$V_i - V_o < 0'7$ OFF

Suponemos D_z



$V_\theta = -0'8 - I_D R + V_A$

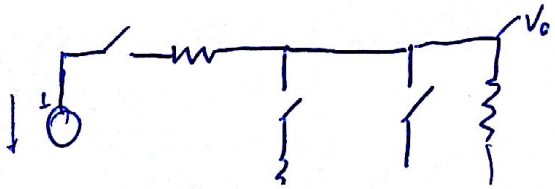
$V_o - V_A \leq -0'8$ ON

$V_\theta = 5'6 + V_A$

$V_o - V_A \geq 5'6$ Ruptura

$D_z \rightarrow$ Si $V_o - V_A \leq -0'8$ ON
Si $-0'8 < V_o - V_A < 5'6$ OFF
Si $V_o - V_A \geq 5'6$ RUPT

HIPO $\rightarrow$ D_1 OFF D_2 OFF D_z OFF



$V_o = V_i$

$V_o = 0$

D_1 OFF $\rightarrow$ $V_i - V_o < 0'7 \Rightarrow |V_o| < 0'7$ ☺

D_2 OFF $\rightarrow$ $V_o > -0'7 \Rightarrow$ ☺

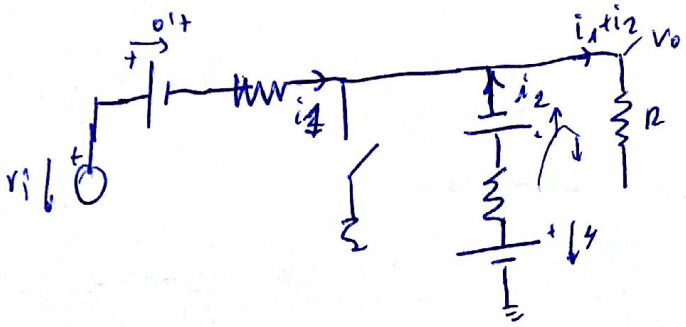
D_z OFF $\rightarrow$ $-0'8 < -4 < 5'6 \leftrightarrow$ ☺

$-4 \leq -0'8 \rightarrow$ ON

HIP1 $\rightarrow$ D_1 OFF D_2 OFF D_z ON

Si $V_i > 2'3 \rightarrow D_1$ ON

HIP 2 → D_1 ON D_2 OFF D_2 ON



$V_0 = (i_1+i_2)R$ $\quad V_0 = V_i - 0'7 - i_1 R$

① $V_i - 0'7 - i_1 R - (i_1+i_2)R = 0$

② $4 - i_2 R - 0'8 - (i_1+i_2)R = 0$

$\Rightarrow 2 \cdot \left(V_i - 0'7 - 2i_1 R - i_2 R = 0\right)$

$-\left(3'2 - i_1 R - 2i_2 R = 0\right)$

$\Rightarrow 2V_i - 1'4 - 3'2 - 3i_1 R = 0 \Rightarrow \boxed{i_1 = \frac{2V_i - 4'6}{3R}}$

$V_0 = V_i - 0'7 - \left(\frac{2V_i - 4'6}{3R}\right)R \Rightarrow \boxed{V_0 = \frac{V_i + 2'5}{3}}$

Comprobamos

D_2 OFF → $V_0 > -0'7$

$\frac{V_i + 2'5}{3} > -0'7$ ☺

$V_i > 2'3$

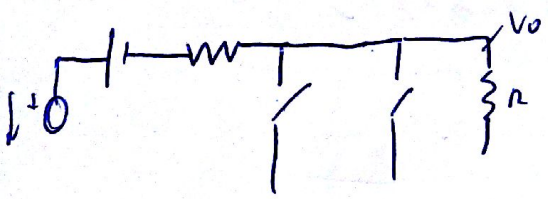
Comprueb.

D_2 ON → $V_0 - 4 \leq -0'8 \Rightarrow V_0 \leq 3'2$

$\frac{V_i + 2'5}{3} \leq 3'2 \rightarrow V_i \leq 7'1$ ☺

Si $V_i > 7'1 \rightarrow$ Pasaría D_2 OFF

HPP 3 D_1 ON D_2 OFF D_2 OFF



$V_i - 0'7 - i_D R = V_0$

$i_D = \frac{V_i - 0'7}{2R}$ $\quad \boxed{V_0 = i_D R = \frac{V_i - 0'7}{2}}$

Comprobamos

D_1 ON → $V_i - V_0 > 0'7 \rightarrow V_i - \frac{V_i - 0'7}{2} > 0'7 \Rightarrow \frac{V_i + 0'7}{2} > 0'7 \rightarrow V_i > 0'7$ $\quad 7'1 > 0'7$ ☺

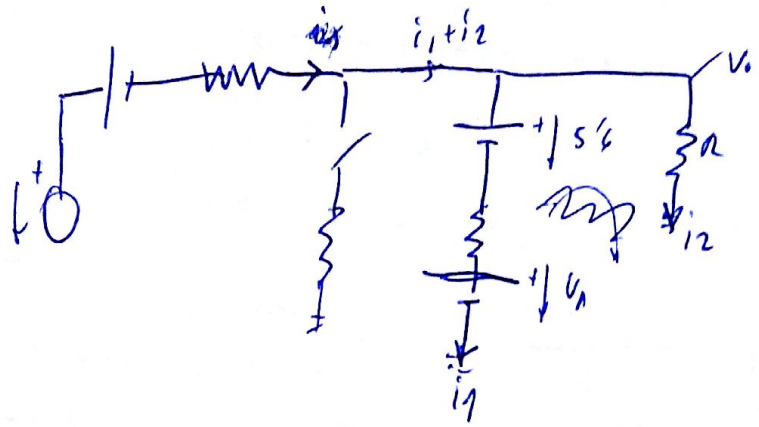
D_2 OFF → $V_0 > -0'7 \rightarrow \frac{V_i - 0'7}{2} > -0'7 \rightarrow 3'2 > -0'7$ ☺

D_2 OFF → $-0'8 < \frac{V_i - 0'7}{2} - 4 < 5'6$ ERROR

HIP 4 $\leq V_i \geq 19'9 \rightarrow D_2$ Ruptura

D_1 ON

D_2 OFF



$V_o = i_2 R$

~~$V_1 = 0'7$~~

① $V_i - 0'7 - (i_1+i_2)R - i_2 R = 0$

② ~~$V_2 =$~~

$V_i - 0'7 - (i_1+i_2)R - 5'6 - i_1 R - 4 = 0$

$\Rightarrow 2\left\{\begin{array}{l} (V_i - 0'7 - i_1 R - 2i_2 R = 0) \\ -(V_1 - 10'3 - 2i_1 R - i_2 R = 0) \end{array}\right. \quad V_i + 8'9 - 3i_2 R = 0 \Rightarrow \boxed{i_2 = \frac{V_i + 8'9}{3R}}$

$$\boxed{V_o < \frac{V_i + 8'9}{3}}$$

Comprueba

D_1 ON $\rightarrow V_i - V_o \geq 0'7 \rightarrow$ ~~V_o~~ ☺

D_2 OFF $\rightarrow V_o > -0'7 \quad 9'6 > -0'7$ ☺

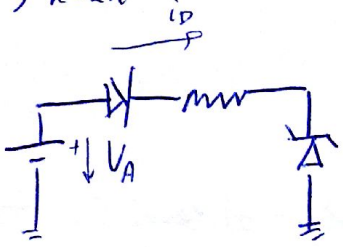
D_2 OFF $\rightarrow V_o - V_A \geq 5'6 \rightarrow 9'6 - 4 \geq 5'6 \rightarrow 5'6 \geq 5'6$ ☺

TABLA

V_i	D_1	D_2	D_Z	V_o
$V_i < 2'3$	OFF	OFF	ON	1'6

(1) $V_\gamma = 3'3$ $R = 2K$

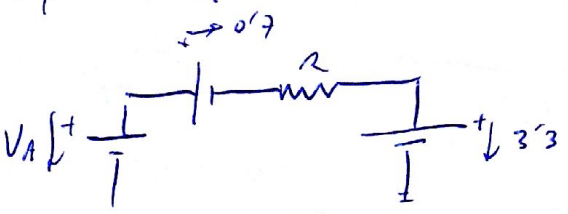
a)



$V_A \geq 0'7 + D_1$ ON

$V_A = 10$; $i_D = \frac{V_A - 0'7 - 3'3}{2} = 3mA$

Suponemos D_1 ON D_2 Rupt $I_D = 0$

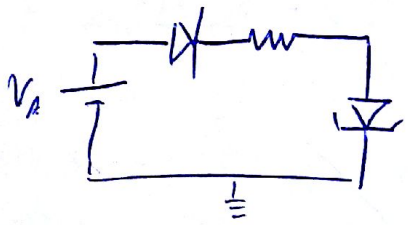


$V_A - 0'7 - i_D R - 3'3 = 0$ ($i_D R \to 0$)

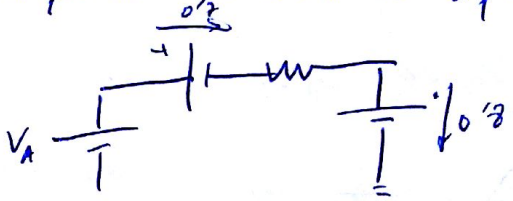
$V_A = 4$ Si $V_A \geq 4 + D_1$ ON D_2 sup

$V_A < 4 + D_1$ OFF

b)



Para que conduzca $I > 0 \to D_1$ ON D_2 ON



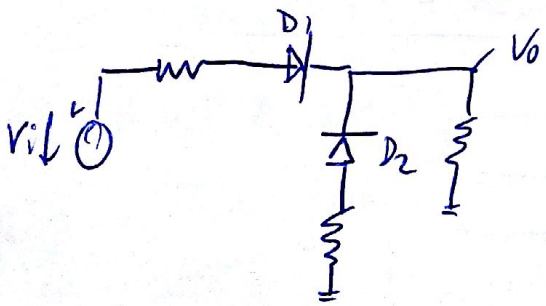
$V_A = 10$; $i_D = \frac{V_A - 0'7 - 0'8}{2} = 4'25mA$

$V_A - 0'7 - I_D R - 0'7 = 0$ ($I_D \to 0$)

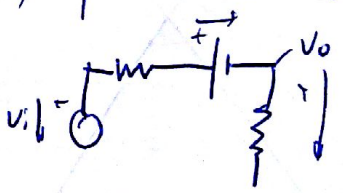
$V_A = 1'5 \to$ Si $V_A \geq 1'5 \to D_1$ ON

Si $V_A < 1'5$ D_1 OFF

(4) $I_{max} = 5mA$, $R = 1K\Omega$



a) Suponemos D_1 ON, $I_D = 0$



$V_i - i_D R - 0'7 = V_0$ ($i_D \to 0$)

$V_i - V_0 = 0'7$

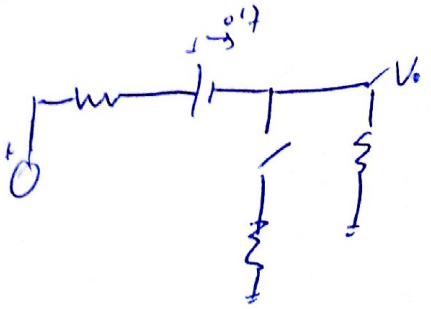
Si $V_i - V_0 \geq 0'7 \to D_1$ ON

$D_1 \to$ $V_i - V_0 < 0'7 \to D_1$ OFF

b) Suponemos D_2 ON, $I_D = 0$

$V_0 = -0'7$

• Si $V_i \geq 0'7 \rightarrow D_1$ ON D_2 OFF



$$i_D = \frac{V_i - 0'7}{2R}$$

$$V_0 = i_D R = \frac{V_i - 0'7}{2R} R \Rightarrow \boxed{V_0 = \frac{V_i - 0'7}{2}}$$

Comprobamos

D_2 OFF $\rightarrow$ $V_0 > -0'7$ $\quad \frac{V_i - 0'7}{2} > -0'7$

D_1 ON $\Rightarrow V_i - V_0 \geq 0'7$; $\quad V_i > -0'7$;

Si $-0'7 < V_i < 0'7 \rightarrow$ D_1 OFF D_2 OFF

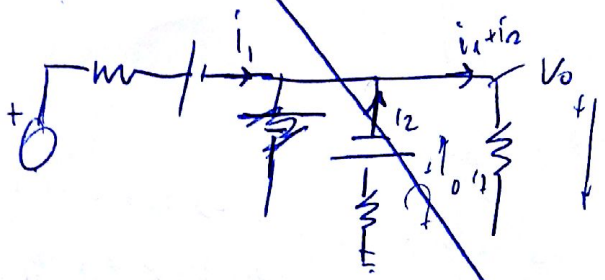
$V_i - \frac{V_i - 0'7}{2} \geq 0'7$

$\frac{V_i - 0'7}{2} \geq 0'7$

$V_i \geq 1'4$

$V_i \geq 2'8$

• Si $V_i \leq -0'7 \rightarrow D_2$ ON D_1 ON



$V_0 = V_i - 0'7 - i_1 R$

$V_i - i_1 R - 0'7 - (i_1 + i_2) R = 0$

$0 - i_2 R - 0'7 - (i_1 + i_2) R = 0$ $\Rightarrow$

$\Rightarrow 2 \left(V_i - 0'7 - 2i_1 R - i_2 R = 0 \right)$

$- \left(-0'7 - i_1 R - 2i_2 R = 0 \right)$

$2V_i - 1'4 + 0'7 - 3I_1 R = 0$

$$\boxed{I_1 = \frac{2V_i - 0'7}{3R}}$$

$V_0 = V_i - 0'7 - \left(\frac{2V_i - 0'7}{3R} \right) R$

$$\Rightarrow \boxed{V_0 = \frac{V_i - 1'4}{3}}$$

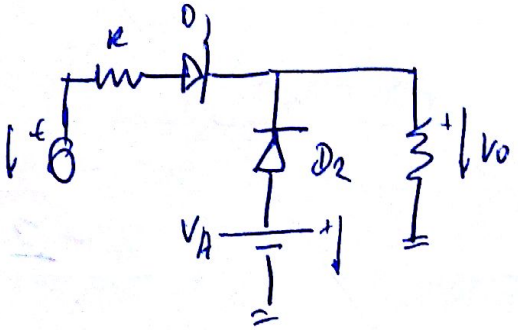
$V_0 = -0'7$

Comprobamos

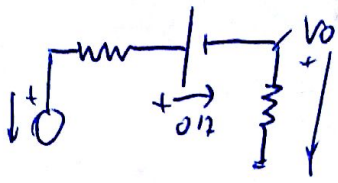
D_1 ON $\rightarrow$ $V_i - V_0 \geq 0'7 \rightarrow$ $V_i \geq 0'7 + V_0 \Rightarrow \boxed{V_i \geq 0} \rightarrow D_1$ ON

b) $D_1 \rightarrow \frac{V_i - 0'7}{2R} < 50mA \rightarrow V_i - 0'7 < 100 \Rightarrow \boxed{V_i < 100'7\ V}$

(5) $V_A = 2V$, $I_{max} = 50mA$ / $R = 1K$



a) Suponemos D_1 ON, $I_D = 0$

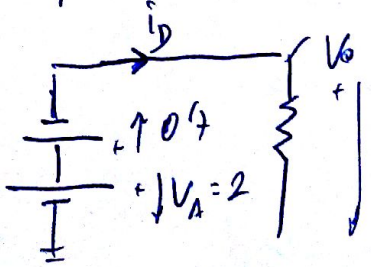


$V_i - i_D R - 0'7 - V_o = 0$ ($i_D R = V_o$)

$V_i - V_o = 0'7$

$D_1 \rightarrow \boxed{\begin{array}{l} \text{Si } V_i - V_o \geq 0'7 \text{ ON} \\ V_i - V_o < 0'7 \text{ OFF} \end{array}}$

b) Suponemos D_2 ON, $I_D = 0$



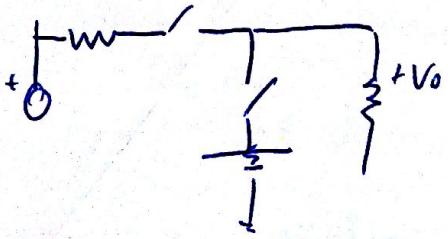
$V_o = -0'7 + 2 = 1'3$

~~$0 + V_A - 0'7 - V_o = 0$~~

~~$V_A - V_o$~~

$\boxed{\begin{array}{l} \text{Si } V_o \geq 1'3 \text{ ON} \\ V_o < 1'3 \text{ OFF} \end{array}}$

HIPO → D_1 OFF D_2 OFF



$V_o = 0$

$\boxed{V_o = V_i'}$

Comprobamos

D_1 OFF → $V_i - V_o < 0'7 \rightarrow V_i < 0'7$ V

D_2 OFF → $V_o < 1'3 \rightarrow 0 < 1'3$ V

Si $V_i \geq 0'7 \rightarrow D_1$ ON

HIP 1 → D_1 ON, D_2 OFF $V_o \geq 0'7$

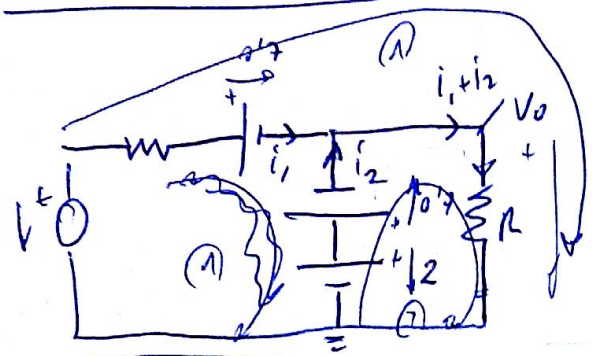
Si $V_i \geq 3'3 \rightarrow D_2$ ON

Comprobamos D_1 ON → $V_i - V_o \geq 0'7 \Rightarrow V_i - \left(\frac{V_i - 0'7}{2}\right) \geq 0'7 \Rightarrow \frac{V_i + 0'7}{2} \geq 0'7$

$\Rightarrow V_i \geq 0'7$ ✓

$V_i \geq 3'3 \rightarrow D_2$ ON

HIP 2 D_1 ON D_2 ON



$V_o = -0'7 + 2 = 1'3$

A $V_i - i_1 R - 0'7 - (i_1+i_2)R = 0$

② $2 - 0'7 - (i_1+i_2)R = 0$

$V_o = -0'7 + 2 + (i_1+i_2)R + 0'7 - 2 = 0$

$\Rightarrow V_i - 0'7 - 2i_1 R - i_2 R = 0$

$-(1'3 - i_1 R - i_2 R) = 0$

$V_i - 0'7 - 1'3 - i_1 R = 0 \Rightarrow \boxed{i_1 = \frac{V_i - 2}{R}}$

~~Comprobamos~~

~~D_1 ON → $V_i - V_o \geq 0'7 \Rightarrow V_i \geq 2$~~

$\boxed{V_o = -0'7 - i_1 R + V_i}$

$V_o = V_i - 0'7 - \left(\frac{V_i - 2}{R} R\right) \Rightarrow V_o = -0'7 - 0'6 = -1'3$

Comprobamos

D_1 ON → $V_i - V_o \geq 0'7 \rightarrow V_i \geq 0'7 + V_o \Rightarrow V_i \geq 2$ ✓ $3'3 \geq 2$ ✓

D_2 ON → $V_o \geq 1'3 \rightarrow 1'3 \geq 1'3$ ✓

TABLA

V_i	D_1	D_2	V_o

b) Para no saturar D_1 →

$i_D = \frac{V_i - 0'7}{} < 50mA$