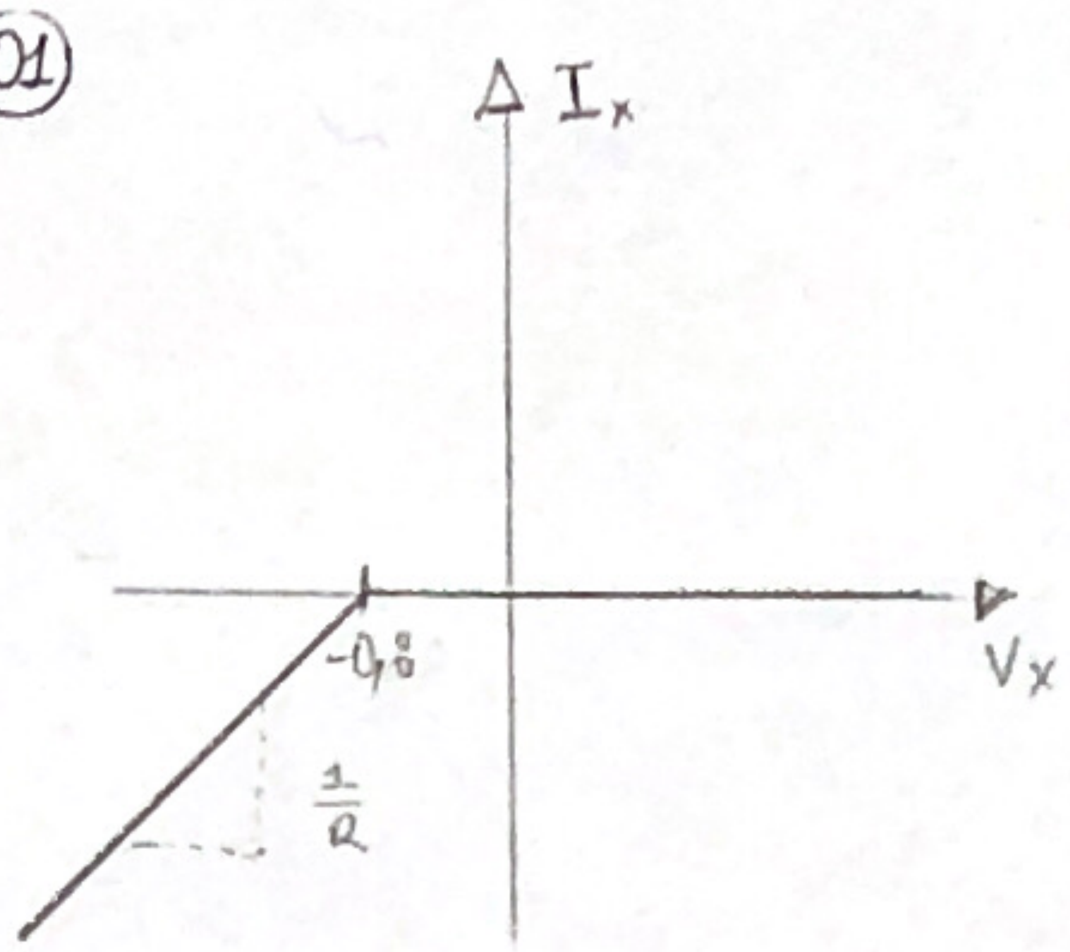
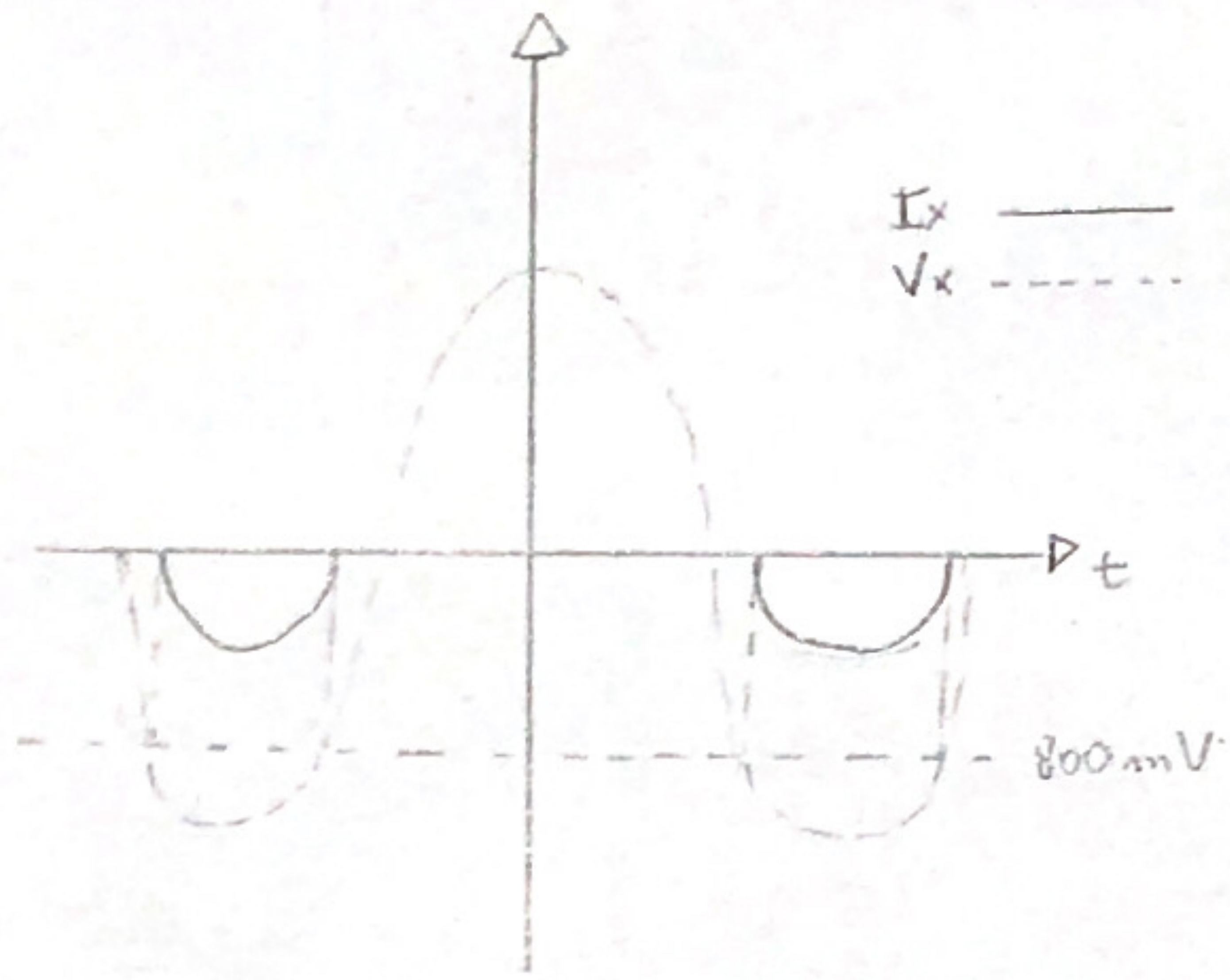
Lista de Exercícios B2. 15/06/2020. Bernardo Rodrigues Marques - 178610.

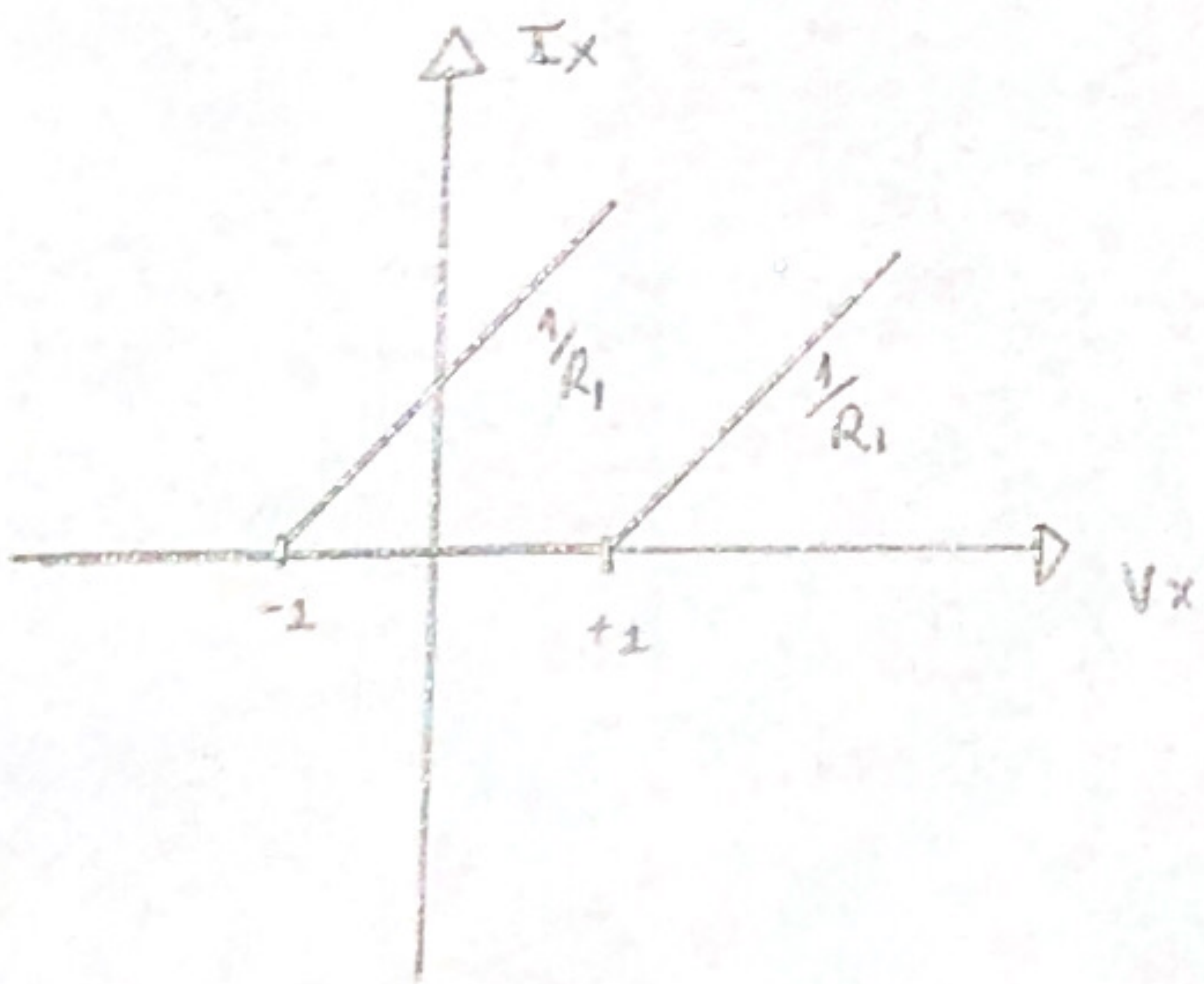
(01)



(02)

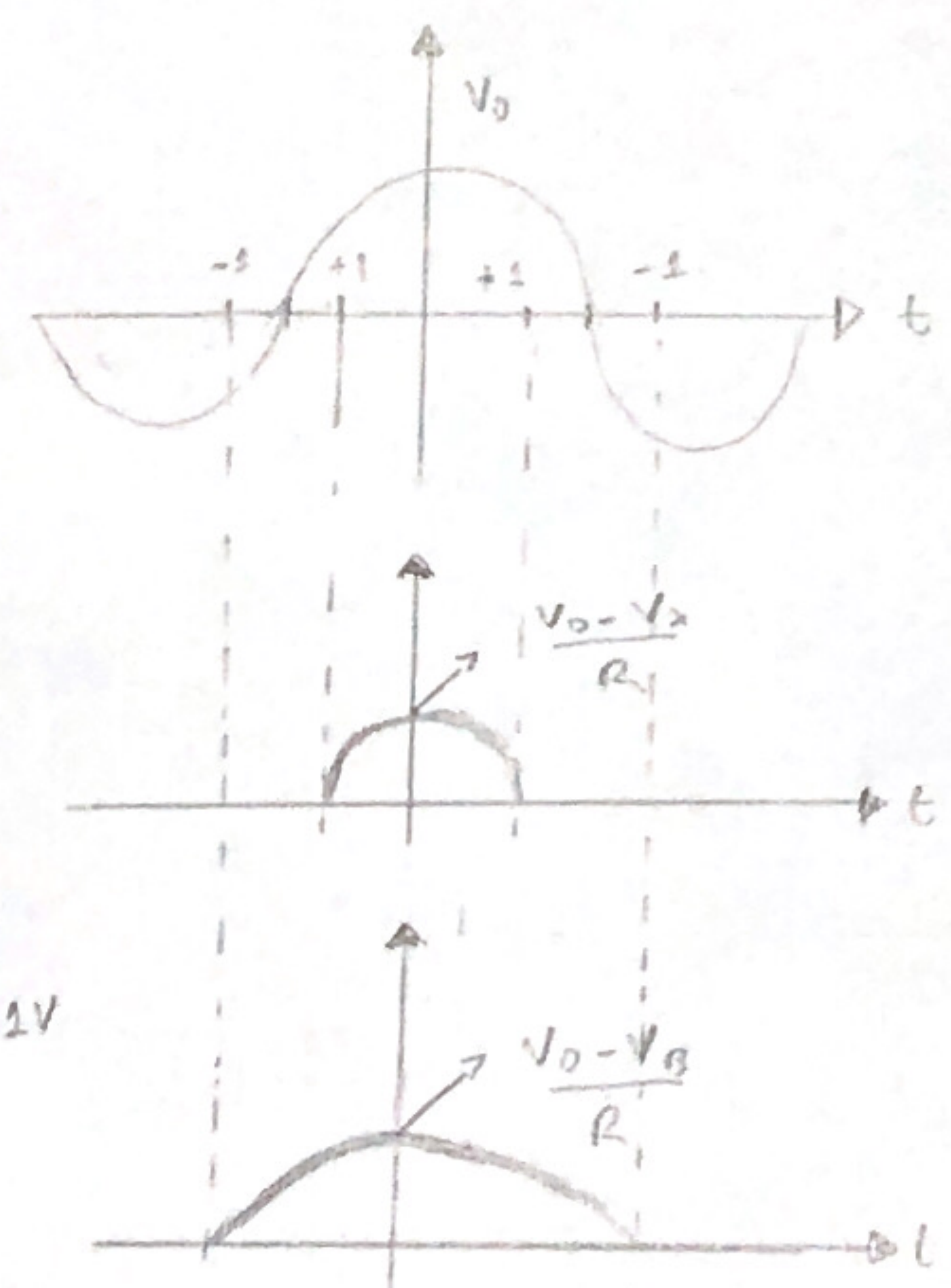


(03)



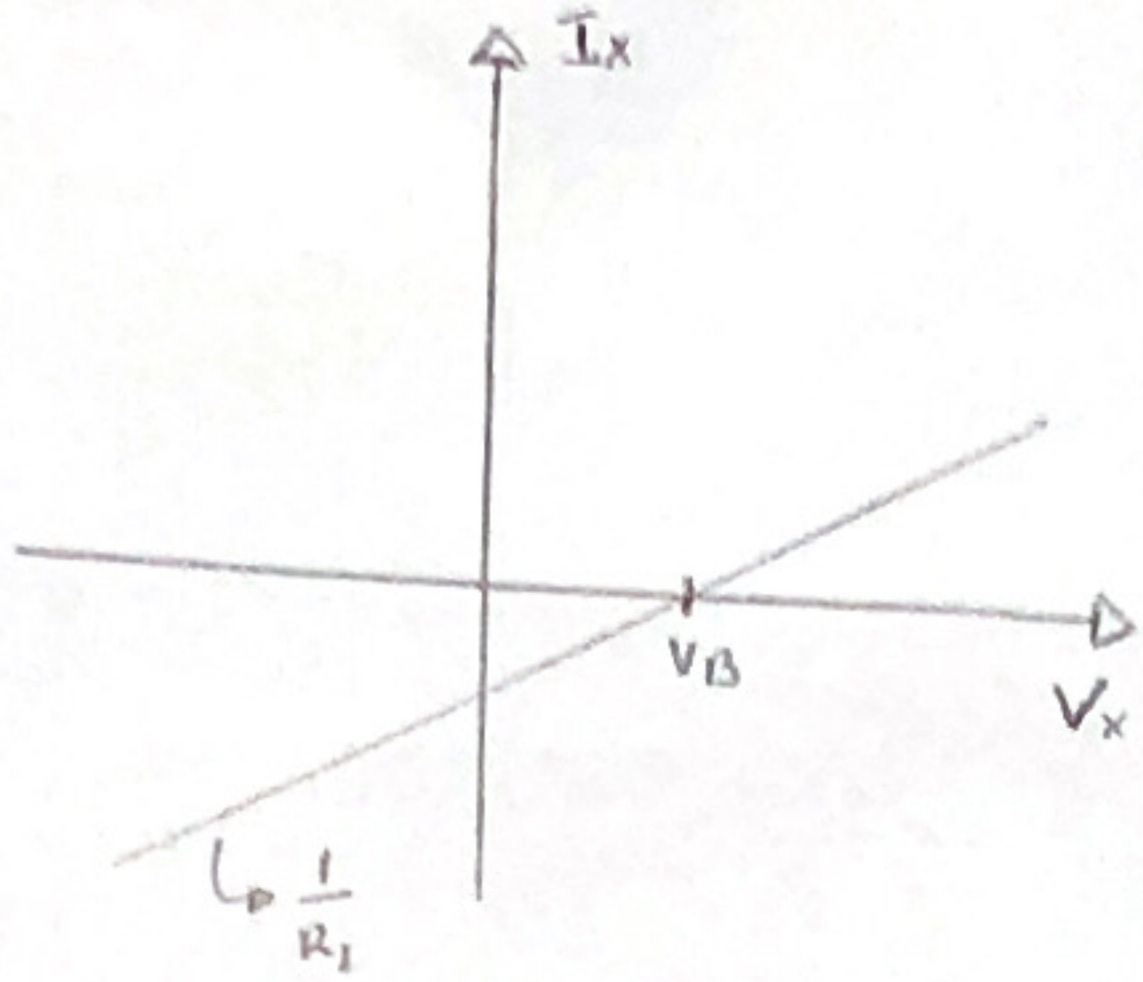
$$I_x = \begin{cases} 0 & V_B > V_x \\ \frac{V_x - V_B}{R}, & V_x > V_B \end{cases}$$

(04)



$V_B = -1V$

(06)

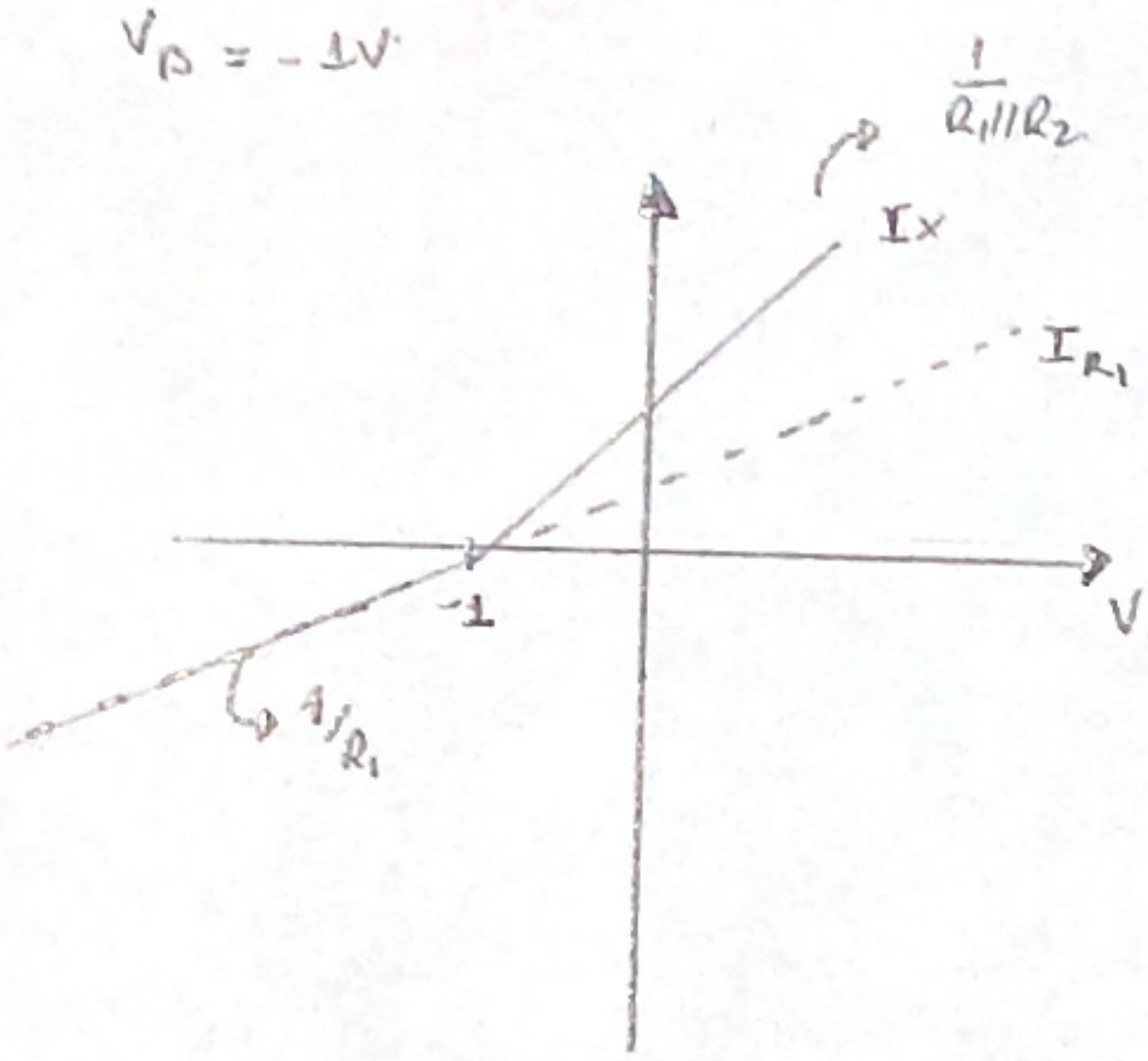


$I_{D_1} = 0 \Rightarrow$ polarizado reversamente

$I_x = \frac{(V_x - V_B)}{R_1}$

(07)

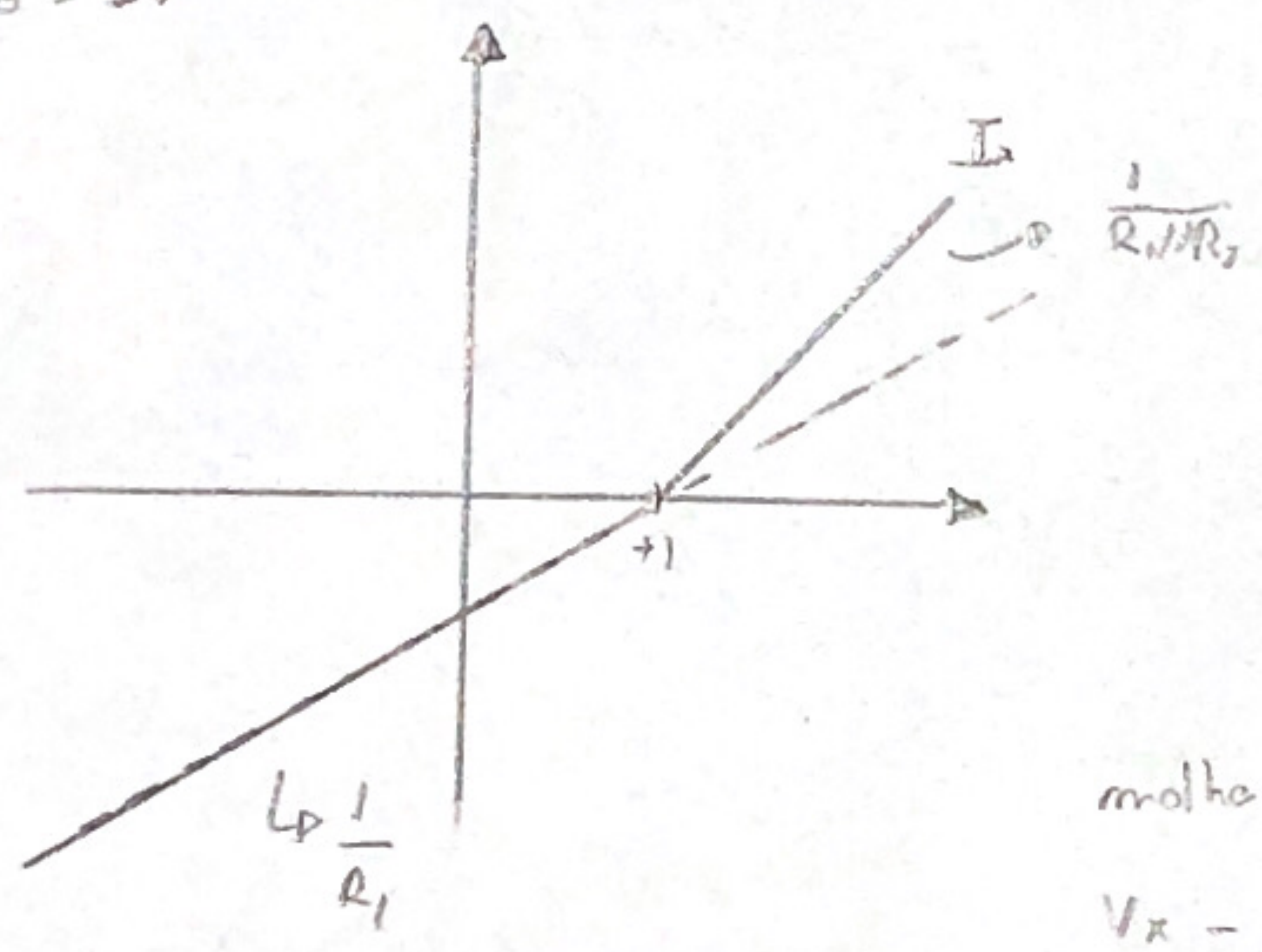
$V_B = -1V$



$$I_x = \begin{cases} \frac{V_x - V_B}{R_1}, & V_x < V_B \\ \frac{V_x - V_B}{R_1//R_2}, & V_x > V_B \end{cases}$$

diodo polarizado reversamente

$V_B = 1V$



malha (1)

$V_x - R_1 I_{R_1} = 0$

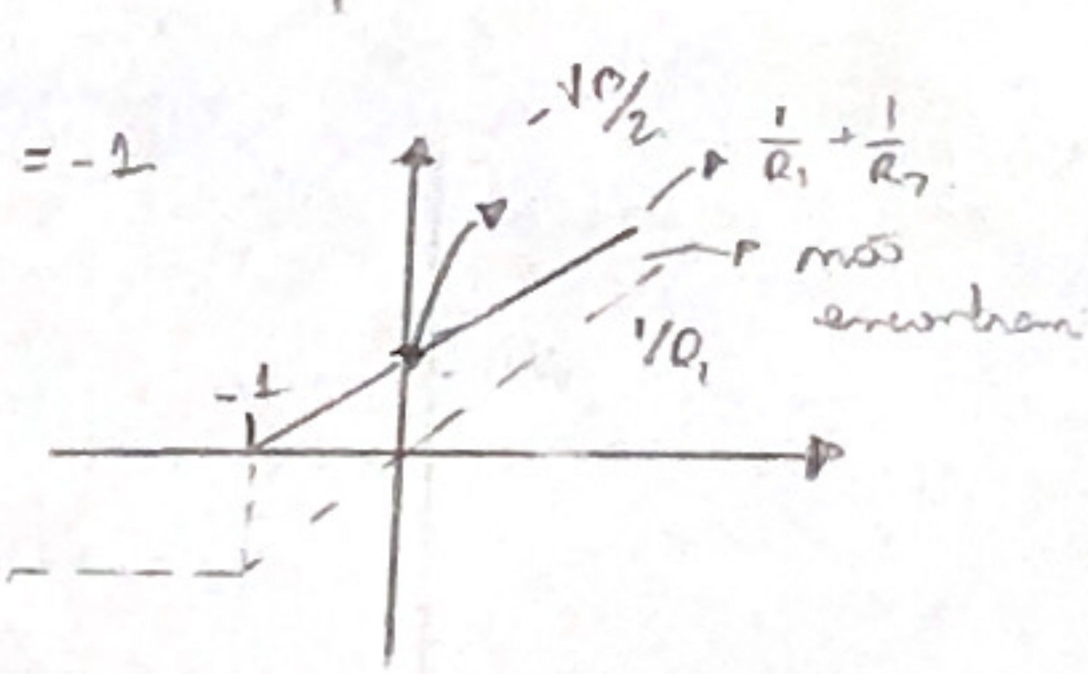
$I_{R_1} = \frac{V_x}{R_1}$

malha (2)

$-V_B - I_{R_2} R_2 + \overbrace{I_{R_1} R_1}^{V_x} = 0$

$I_{R_2} = \frac{V_x - V_B}{R_2}$

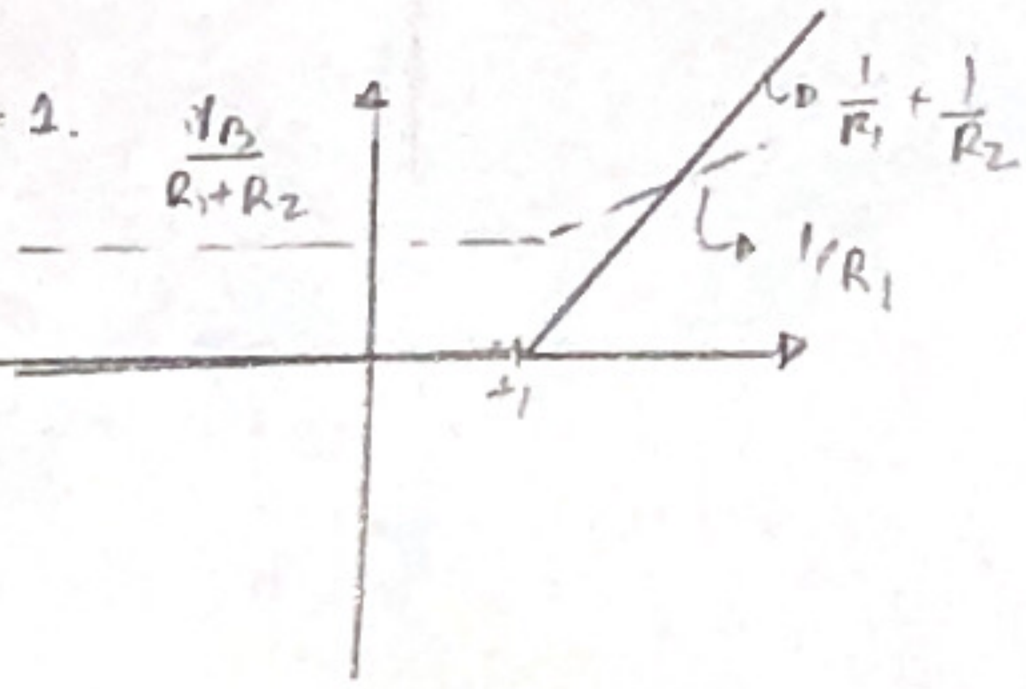
(08) $V_B = -1$



$I_x = \frac{V_x}{R_1} + \frac{V_x - V_B}{R_2}$

$$I_x = \begin{cases} 0, & V_x < \frac{V_B}{R_1 + R_1} \cdot R_1 \\ \frac{V_x}{R_1} + \frac{V_x - V_B}{R_2}, & V_x > \frac{V_B}{R_1 + R_2} R_1 \end{cases}$$

$V_B = 1.$

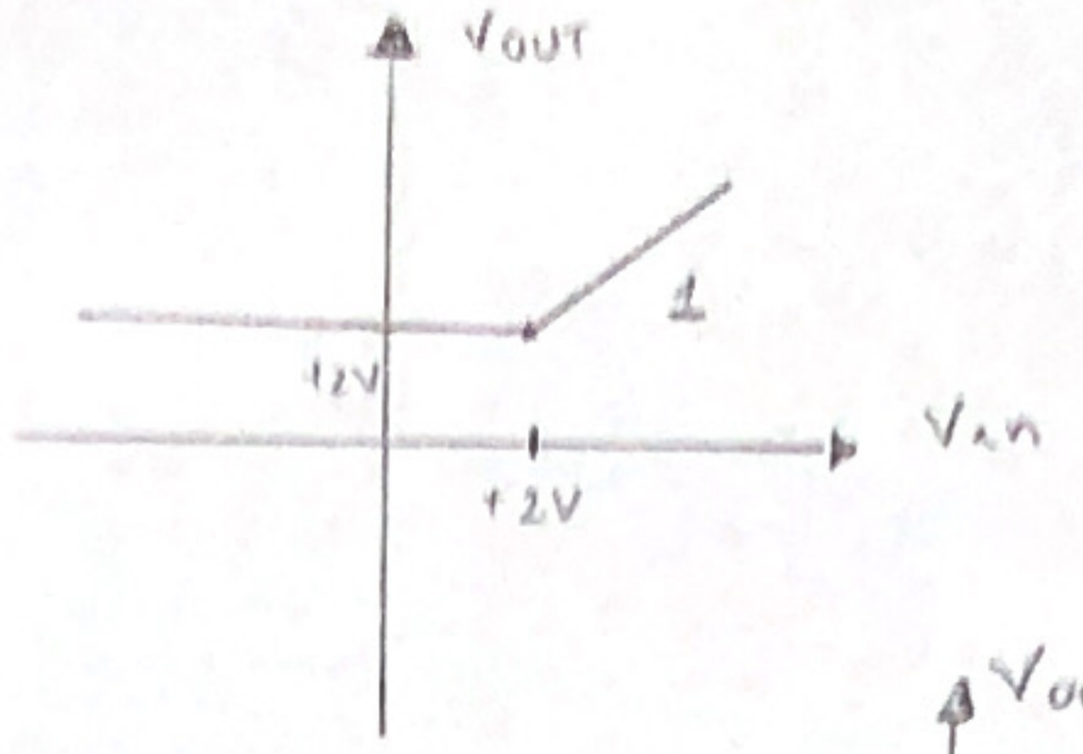


$$I_{R_1} = \begin{cases} \frac{V_B}{R_1 + R_2}, & V_x < \frac{V_B}{R_1 + R_2} R_1 \\ \frac{V_x}{R_1}, & V_x > \frac{V_B}{R_1 + R_2} R_1 \end{cases}$$

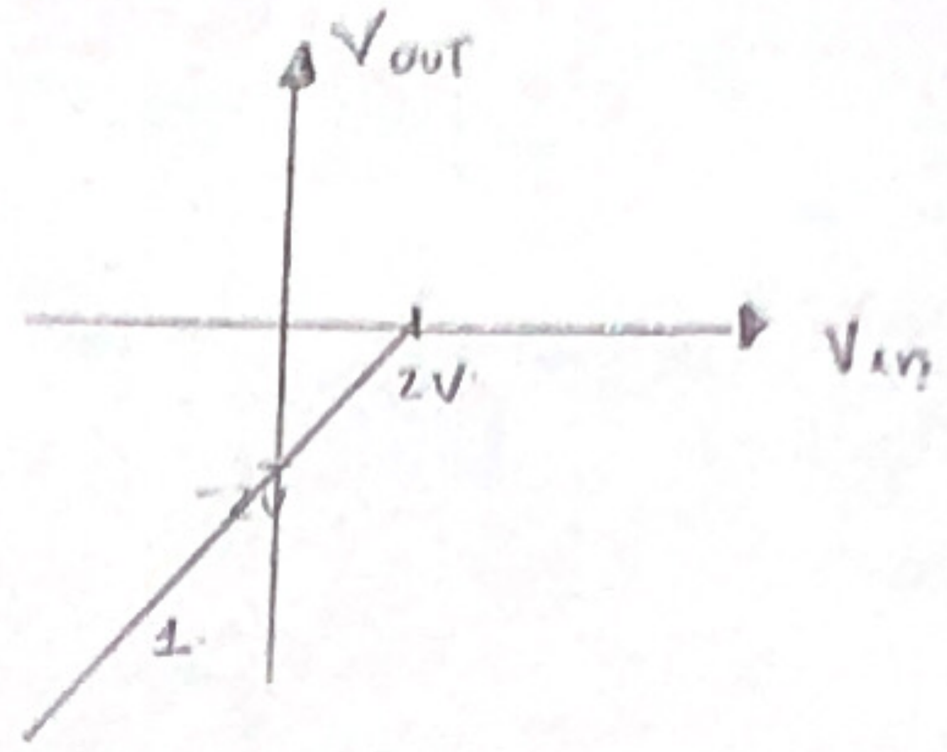
(09) $V_B = 2V$

(a)

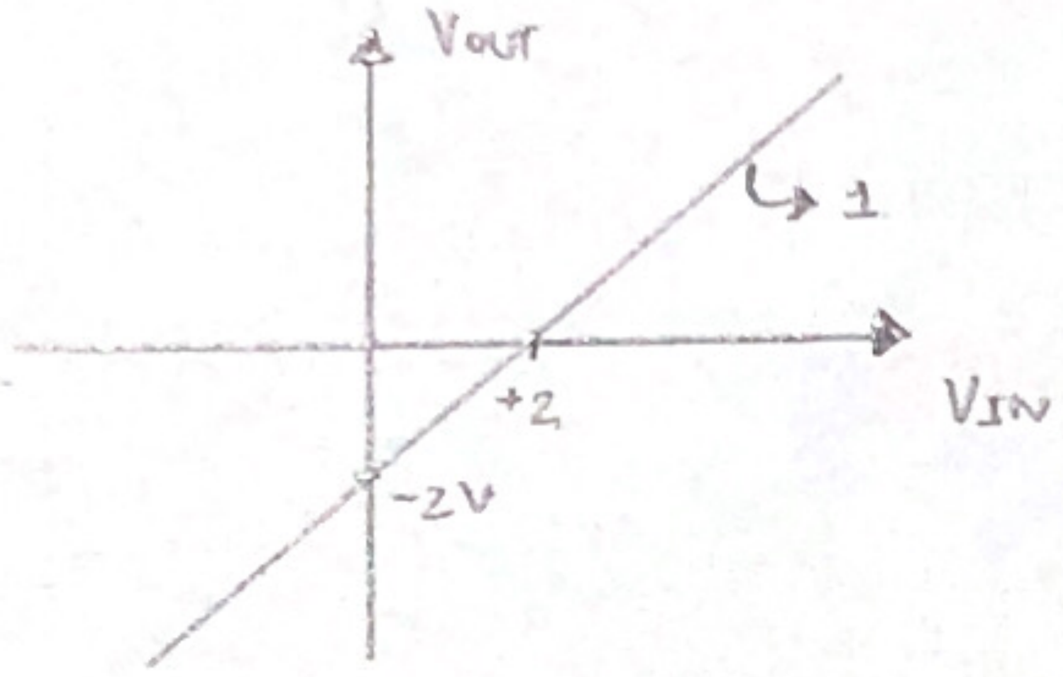
$$V_{OUT} = \begin{cases} V_B, & V_{IN} < V_B \\ V_{IN}, & V_{IN} > V_B \end{cases}$$



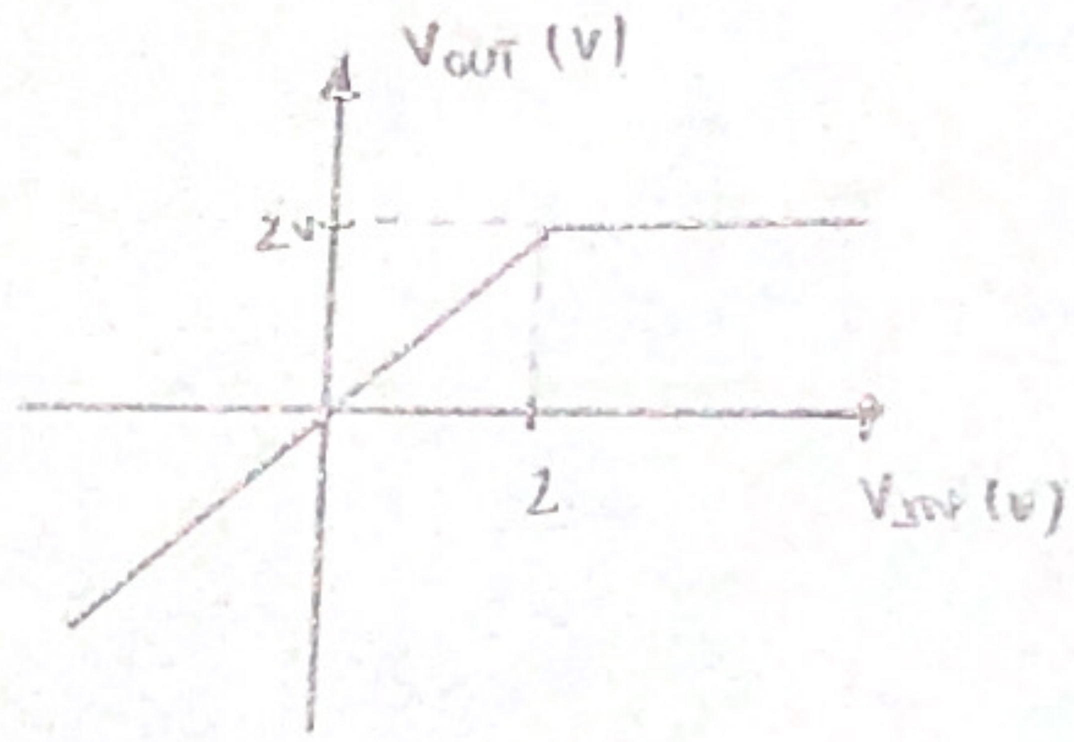
(b) $$V_{OUT} = \begin{cases} V_{IN} - V_B, & V_{IN} < V_B \\ 0, & V_{IN} > V_B \end{cases}$$



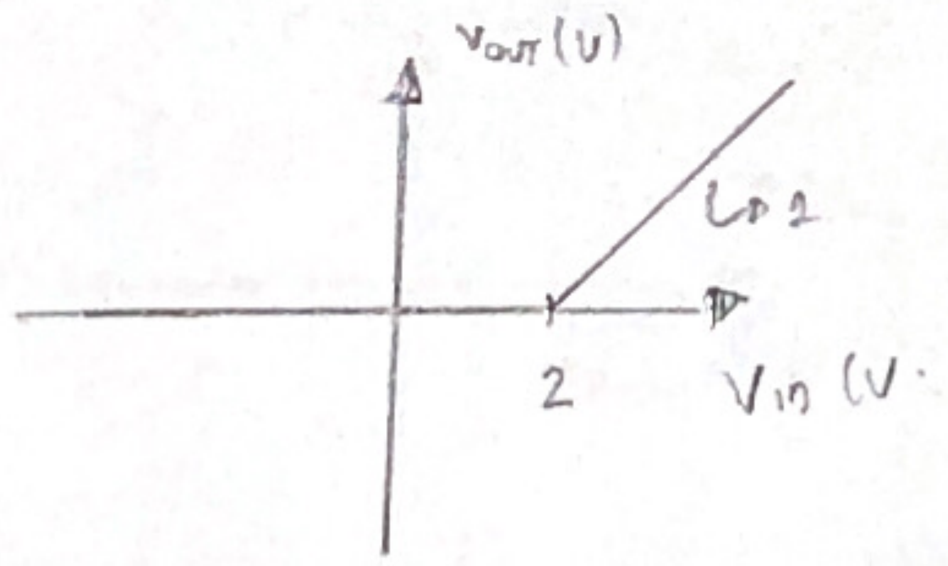
(c) $V_{OUT} = V_{IN} - V_B$



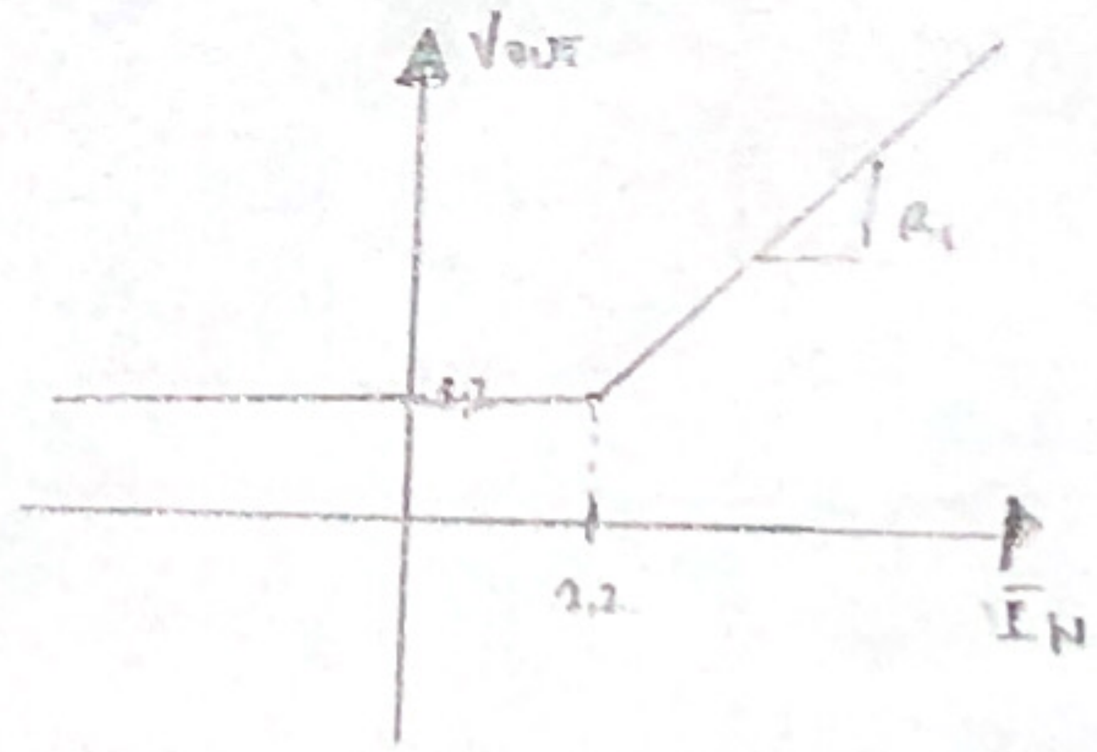
(d) $$V_{OUT} = \begin{cases} V_{in}, & V_{IN} < V_B \\ V_B, & V_{IN} > V_B \end{cases}$$



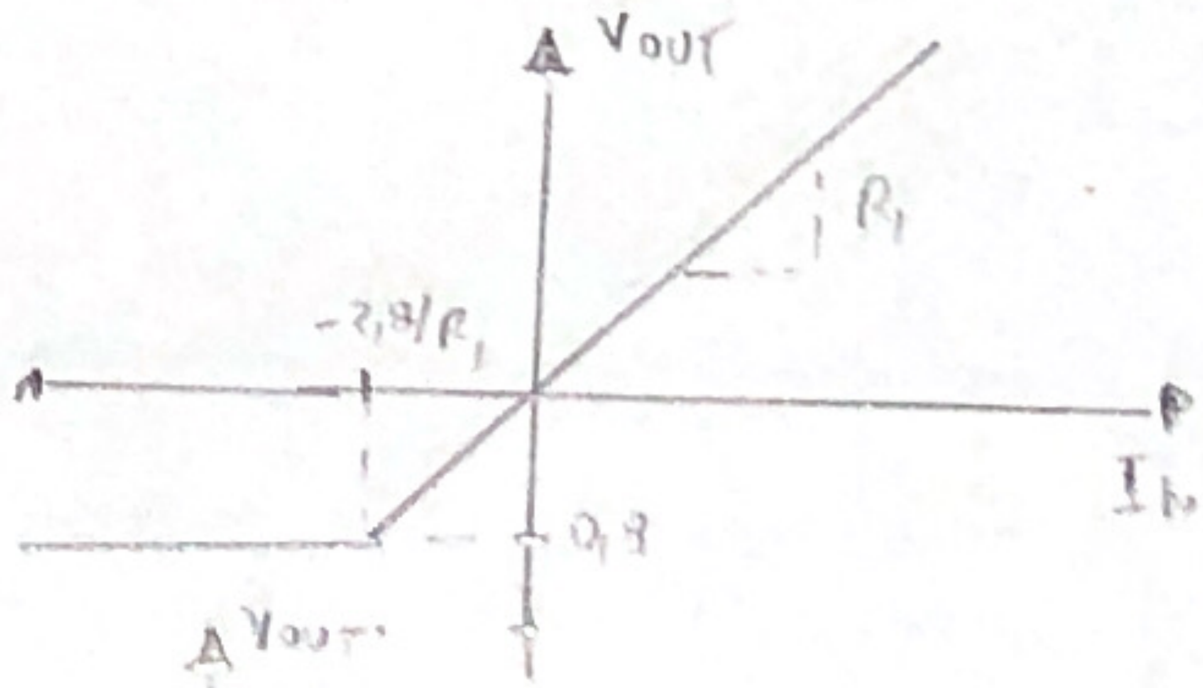
(e) $$V_{OUT} = \begin{cases} 0, & V_{IN} < V_B \\ V_{IN} - V_B, & V_{IN} > V_B \end{cases}$$



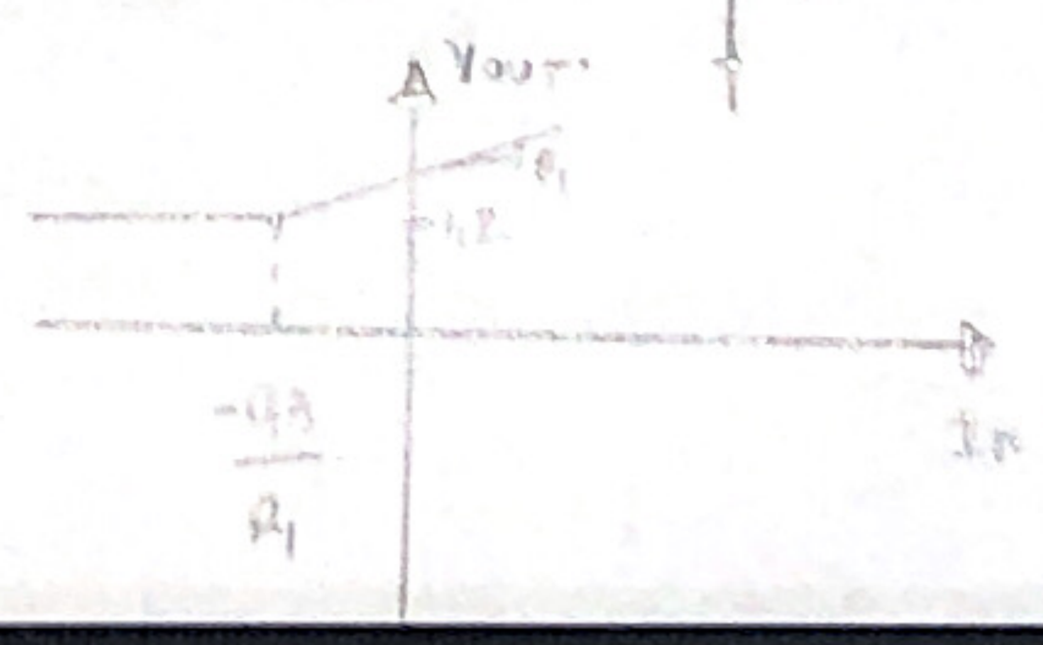
(13) (a) $$V_{OUT} = \begin{cases} V_B - V_{DON}, & I_N < \frac{V_B - V_{DON}}{R_1} = \frac{1{,}2}{R_1} \\ I_N \cdot R_1, & I_N > \frac{1{,}2}{R_1} \end{cases}$$



(b) $$V_{OUT} = \begin{cases} -2{,}8, & I_N < \frac{-2{,}8}{R} \\ I_N R_1, & I_N > \frac{-2{,}8}{R} \end{cases}$$ $\frac{-V_B - V_{DON}}{R_1}$

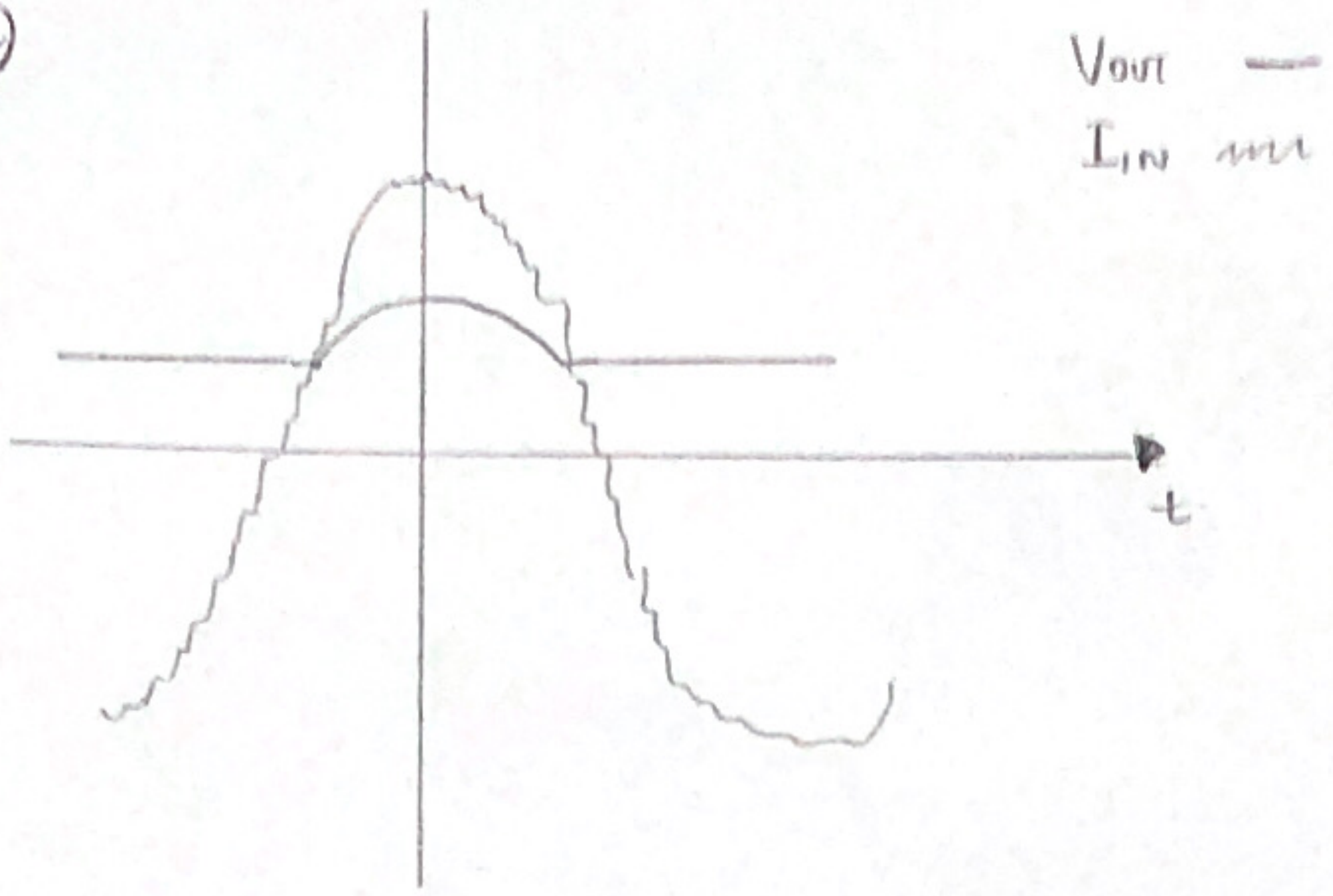


(c) $$V_{OUT} = \begin{cases} V_B - V_{DON} = 1{,}2, & I_{in} < \frac{-0{,}8}{R_1} \\ I_N \times R_1 + V_B, & I_{in} > \frac{-0{,}8}{R_1} \end{cases}$$

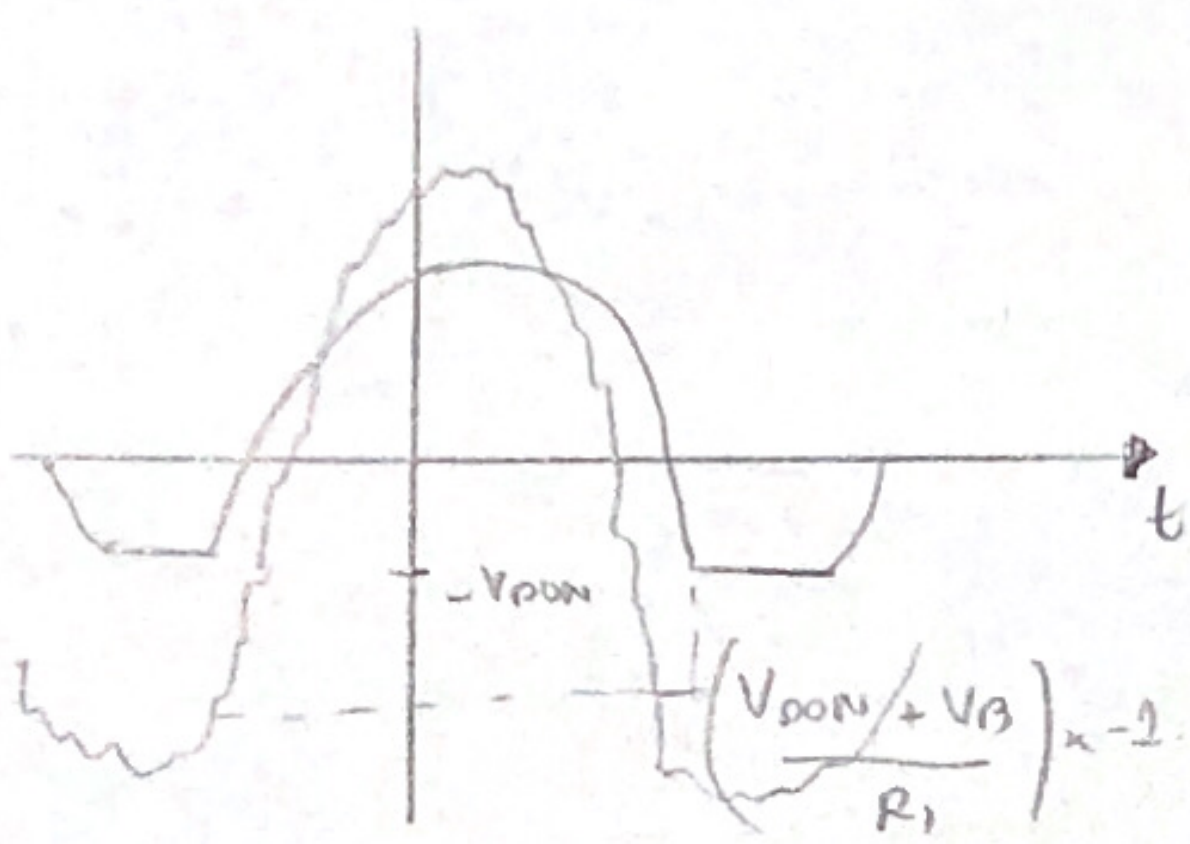


(20) Usando os dados da questão anterior.

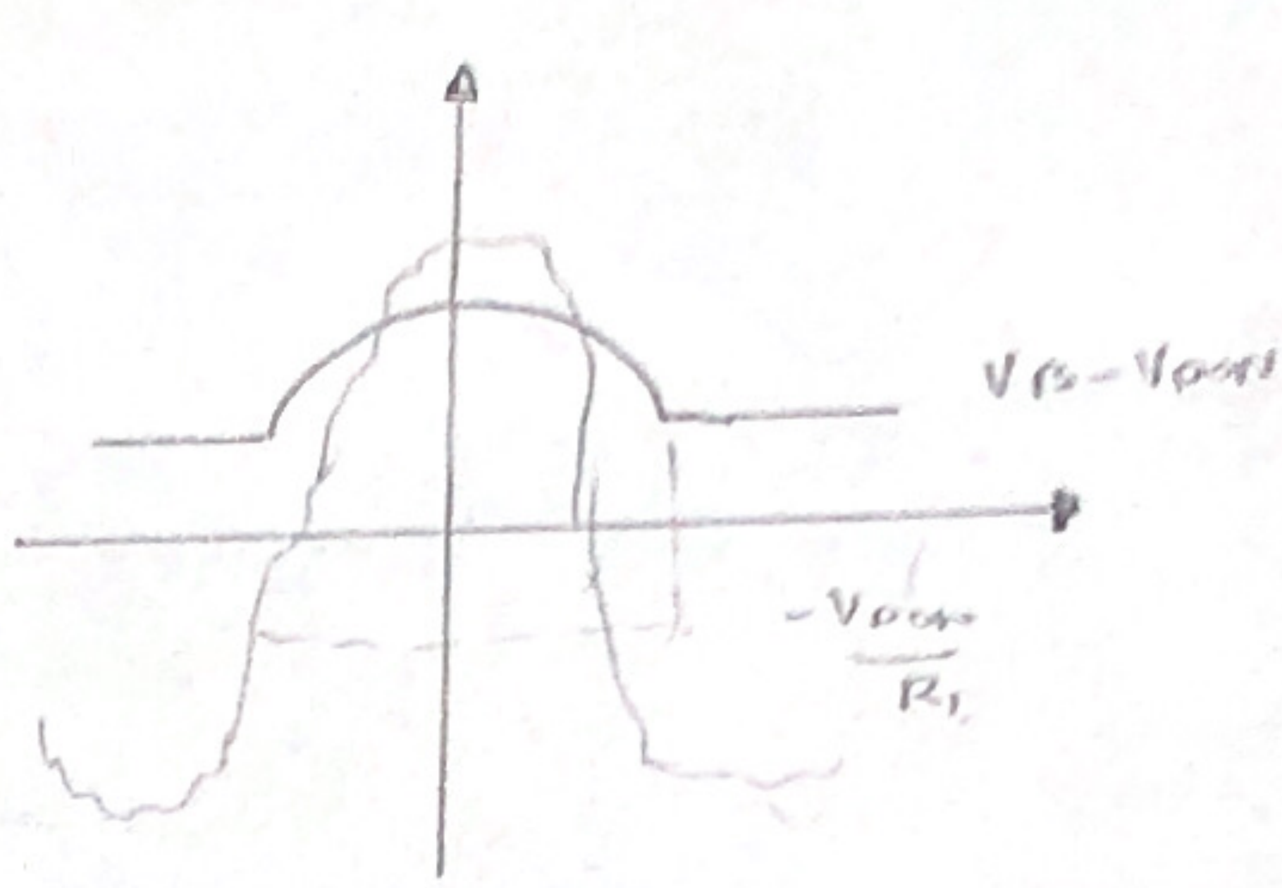
(a)



(b)

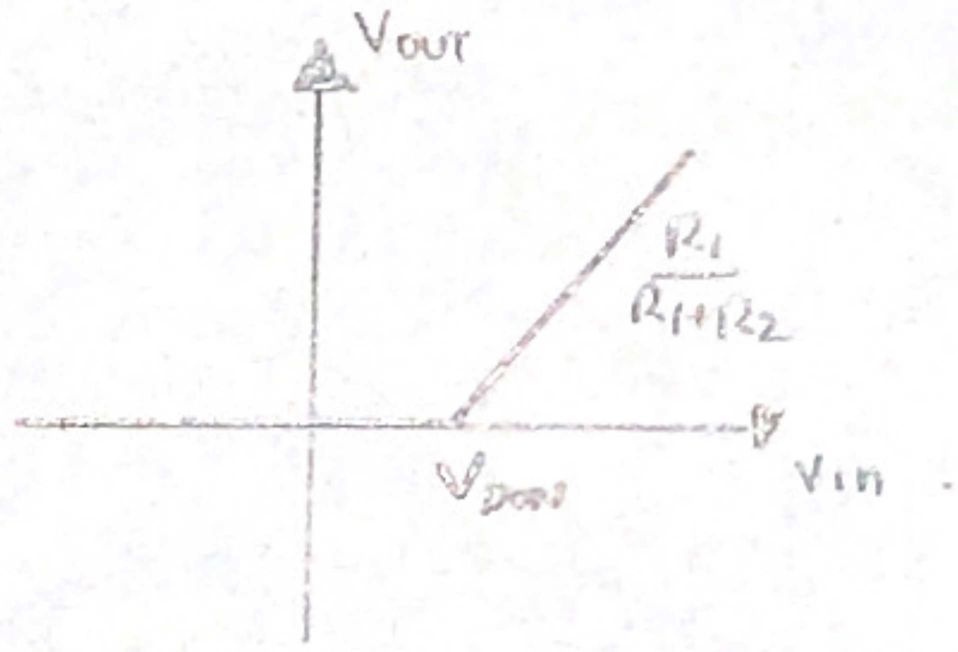


(c)

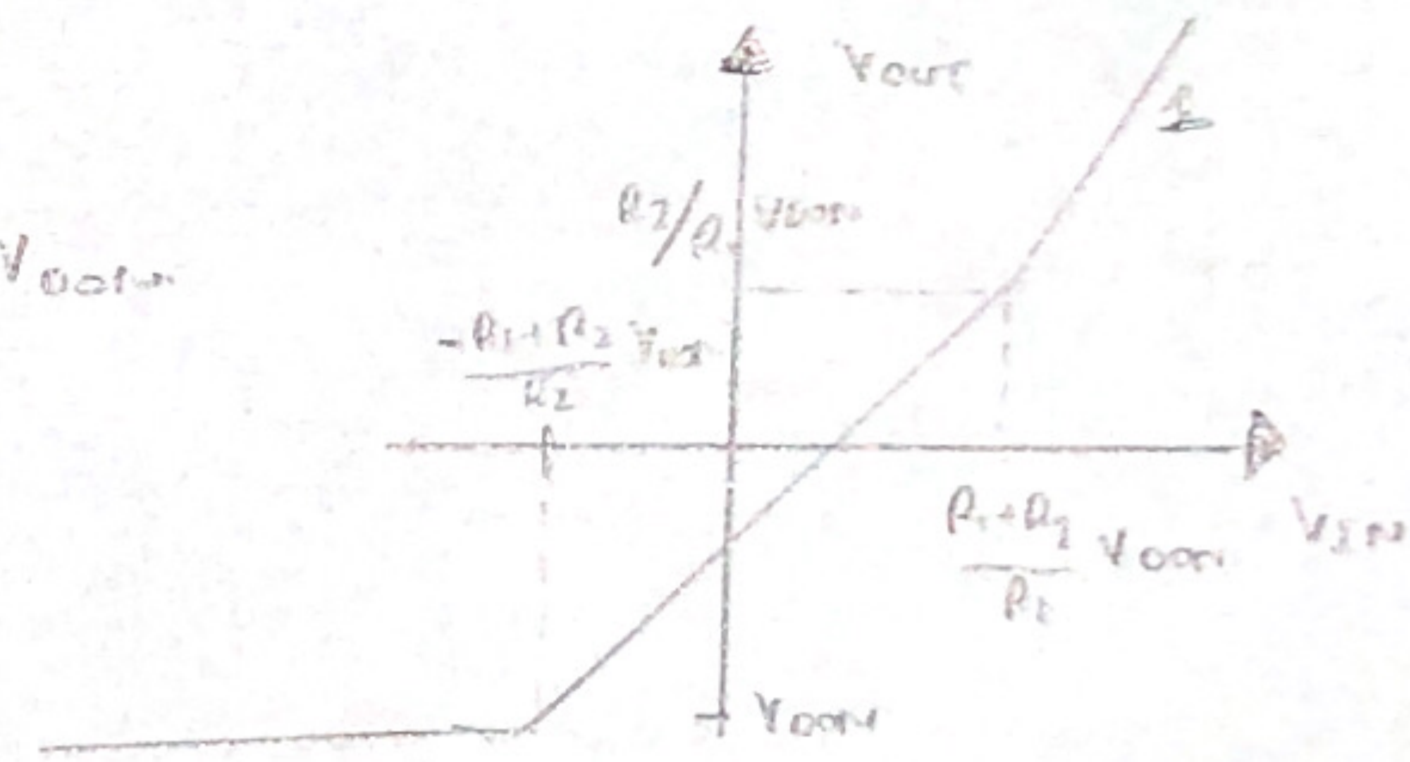


(27)

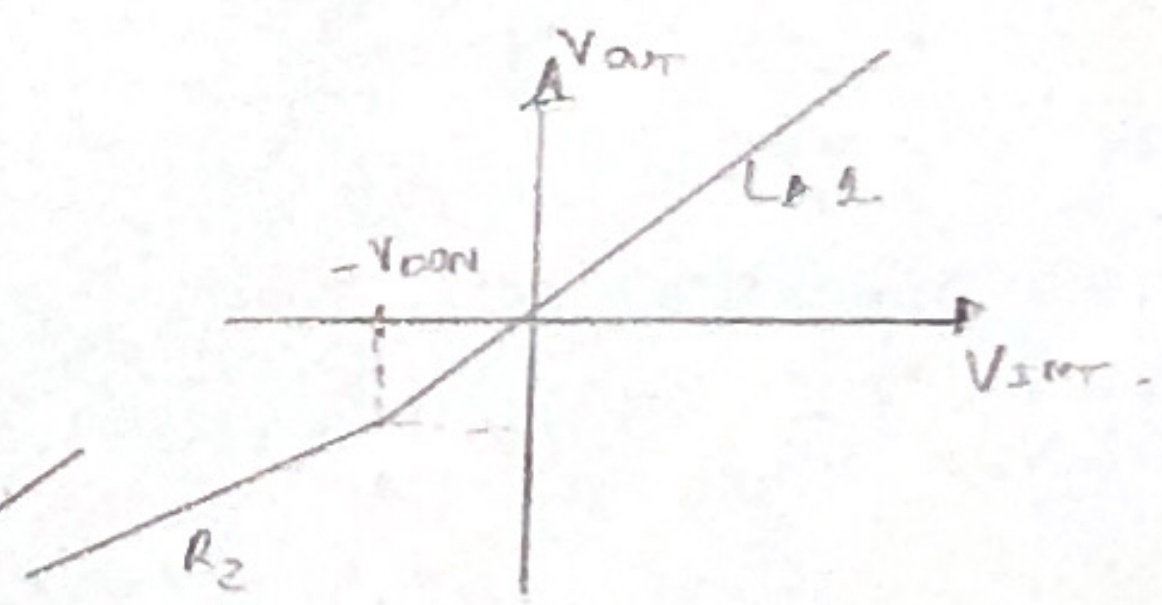
(a) $V_{OUT} = \begin{cases} 0, & V_{in} < V_{DON} \\ \frac{R_2}{R_1+R_2}(V_{in} - V_{DON}), & V_{IN} > V_{DON} \end{cases}$



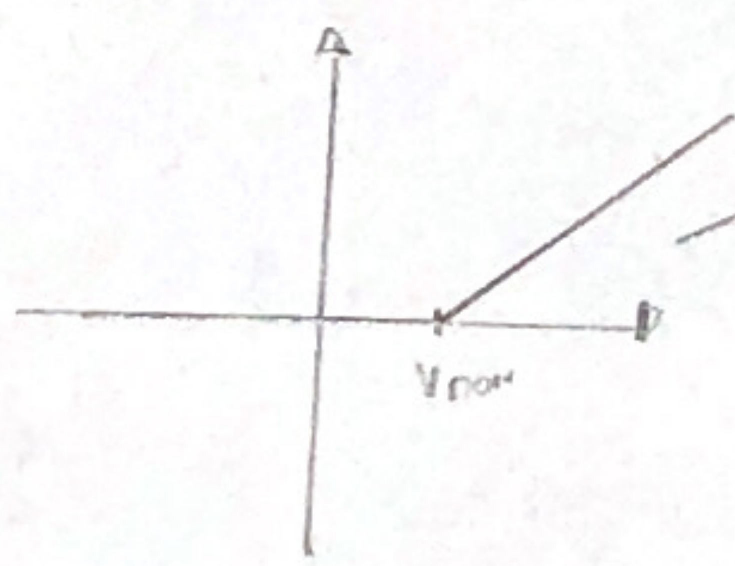
(b) $V_{OUT} = \begin{cases} -V_{DON}, & V_{IN} < -\frac{R_1+R_2}{R_2} V_{DON} \\ \frac{R_2}{R_1+R_2} V_{in}, & -\frac{R_1+R_2}{R_2} V_{DON} < V_{IN} < \frac{R_1+R_2}{R_1} V_{DON} \\ V_{IN} - V_{DON}, & V_{in} > \frac{R_1+R_2}{R_1} V_{DON} \end{cases}$



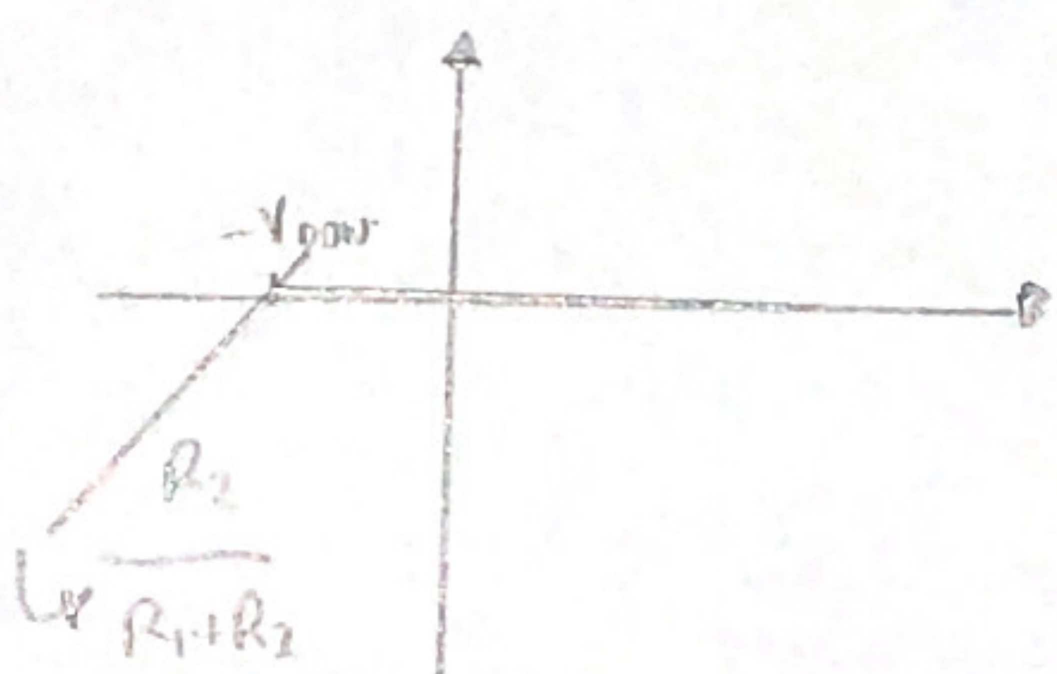
(c) $V_{OUT} = \begin{cases} \frac{R_2}{R_1+R_2}(V_{in} + V_{DON}) - V_{DON} & V_{in} < -V_{DON} \\ V_{in} & V_{in} > -V_{DON} \end{cases}$



(d) $V_{OUT} = \begin{cases} 0 & V_{in} < V_{DON} \\ \frac{R_2}{R_1+R_2}(V_{in} - V_{DON}) & V_{in} > V_{DON} \end{cases}$



(e) $V_{OUT} = \begin{cases} \frac{R_2}{R_1+R_2}(V_{in} + V_{DON}) & V_{in} < -V_{DON} \\ 0 & V_{in} > -V_{DON} \end{cases}$



(32)

(a) $\Delta V_{OUT} = \Delta I_{in} R_1 = 100\,mV$

(b) $I_{D1} = I_{D2} = I_{in} = 3\,mA$

$Rd_1 = Rd_2 = \dfrac{V_T}{I_{D1}} = 8.67\,\Omega$

$\Delta V_{OUT} = \Delta I_{in} (R_1 + rd_2) = 100.867\,mV$

(c) $I_{D1} = I_{D2} = I_{in} = 3\,mA$

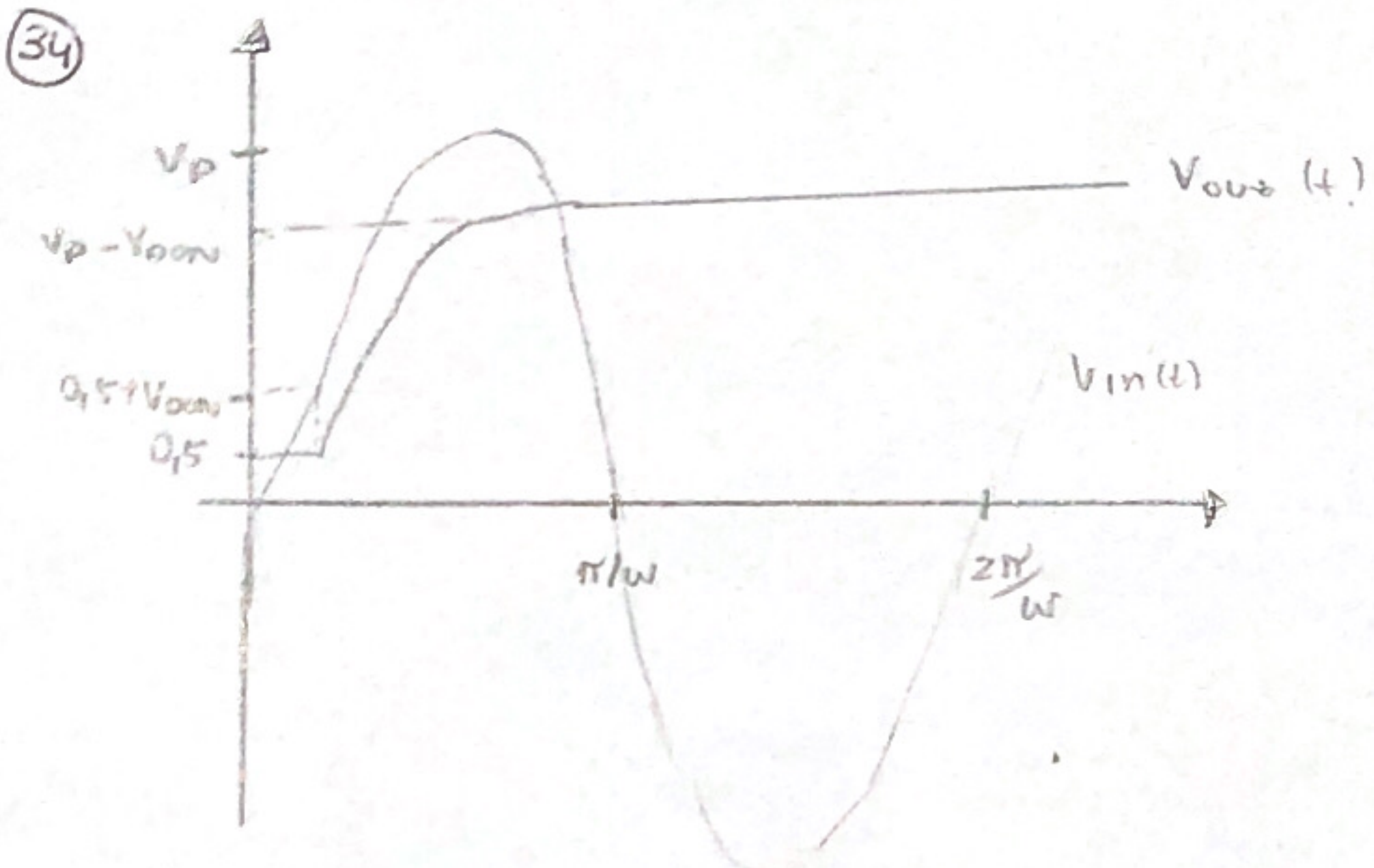
$Rd_1 = Rd_2 = \dfrac{V_T}{I_{D1}} = 8.67\,\Omega$

$\Delta V_{OUT} = \Delta I_{in}\, Rd_2 = 0.867\,mV$

(d) $I_{D2} = I_{in} - \dfrac{V_{DON}}{R_2} = 2.6\,mA$

$Rd_2 = \dfrac{V_T}{I_{D2}} = 10\,\Omega \qquad \Delta V_{OUT} = \Delta I_{in} (R_2 \| Rd_2) = \boxed{0.995\,mV}$

(34)

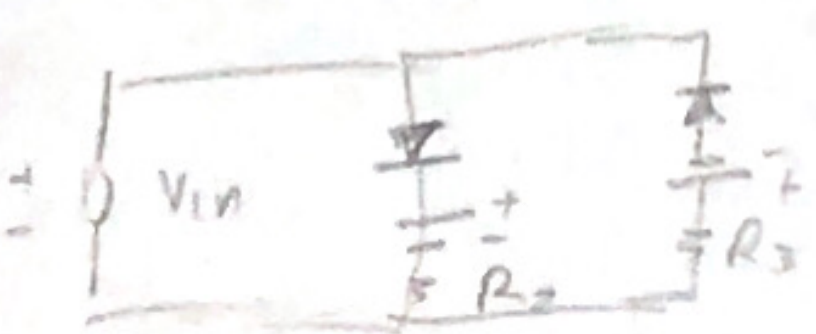


(37) $V_R = \dfrac{I_L}{C_1 f_{in}} < 300\,mV \qquad f_{in} = 60\,Hz \qquad I_L = 0.5\,A \qquad C_1 \geq \dfrac{I_L}{(300)\, f_{in}} = 27.78\,mF$

(40) No ciclo positivo, D_2 e D_3 não permitirão passagem de corrente, portanto o saída $V_{out} = 0$. Já no ciclo negativo, D_1 e D_3 permitirão a passagem de corrente, por um certo período de tempo e não passará corrente por R_L. V_{out} permanecerá 0.

(41) $V_R = 1/2 \cdot \dfrac{V_P - 2V_{DON}}{R_L C_1 f} = \dfrac{1}{2} \cdot \dfrac{3 - 2 \times 0.8}{30 \times 1000 \times 10^{-6} \times 60} = \underline{0.389\,V}$

(42)



$V_{D1} = V_{D2} = (2 - 0.8) = 1.2\,V$

$V_{in} > 2V, \quad \dfrac{V_{out}}{V_{in}} = 0.5 \qquad R_1 = R_2 = R_3 = 1\,k\Omega$