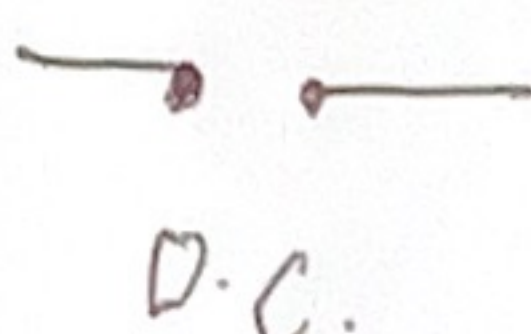
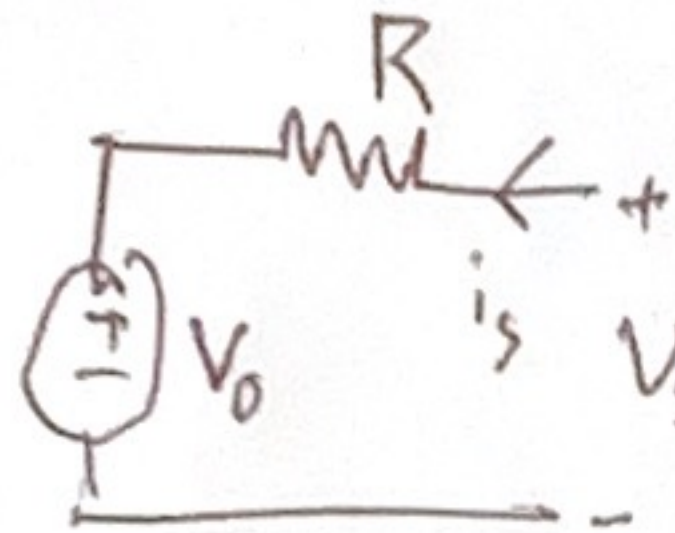
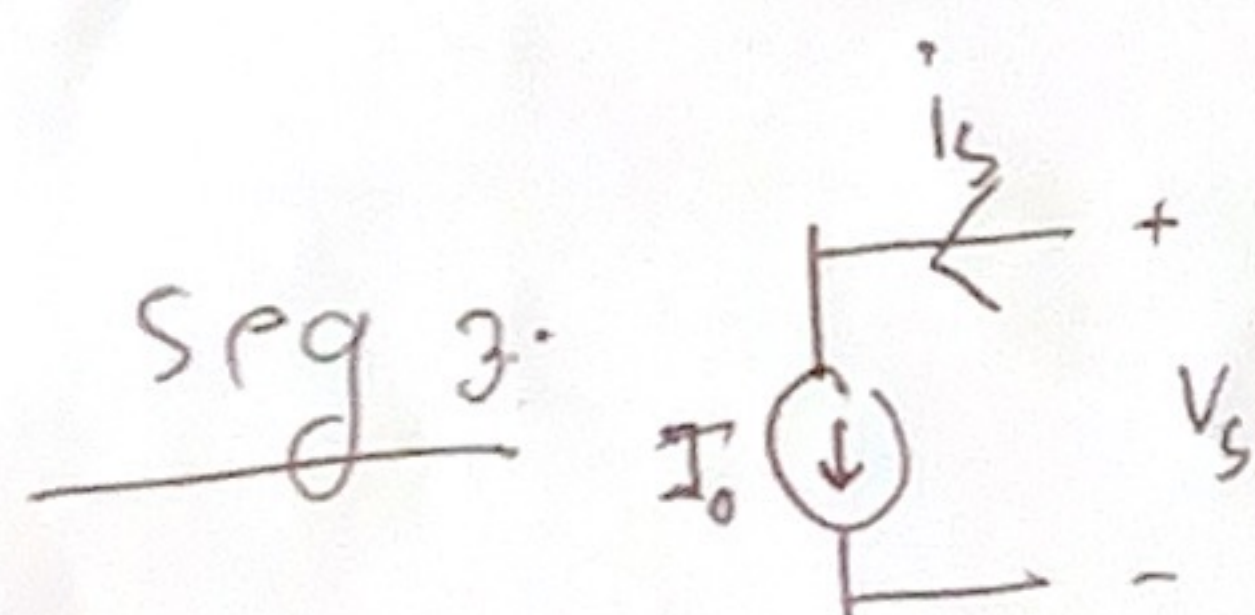


	model	Param	cond
① a) <u>Seg 1:</u>	 D.C.	no param	$V_s \leq 2V$
<u>Seg 2:</u>		$V_0 = x\text{-intercept} = 2V$ $R = \frac{1}{\text{slope}} = 0.8k\Omega$	$V_s \leq 2 \leq 5V$

$$y = 1.25(x - 2)$$

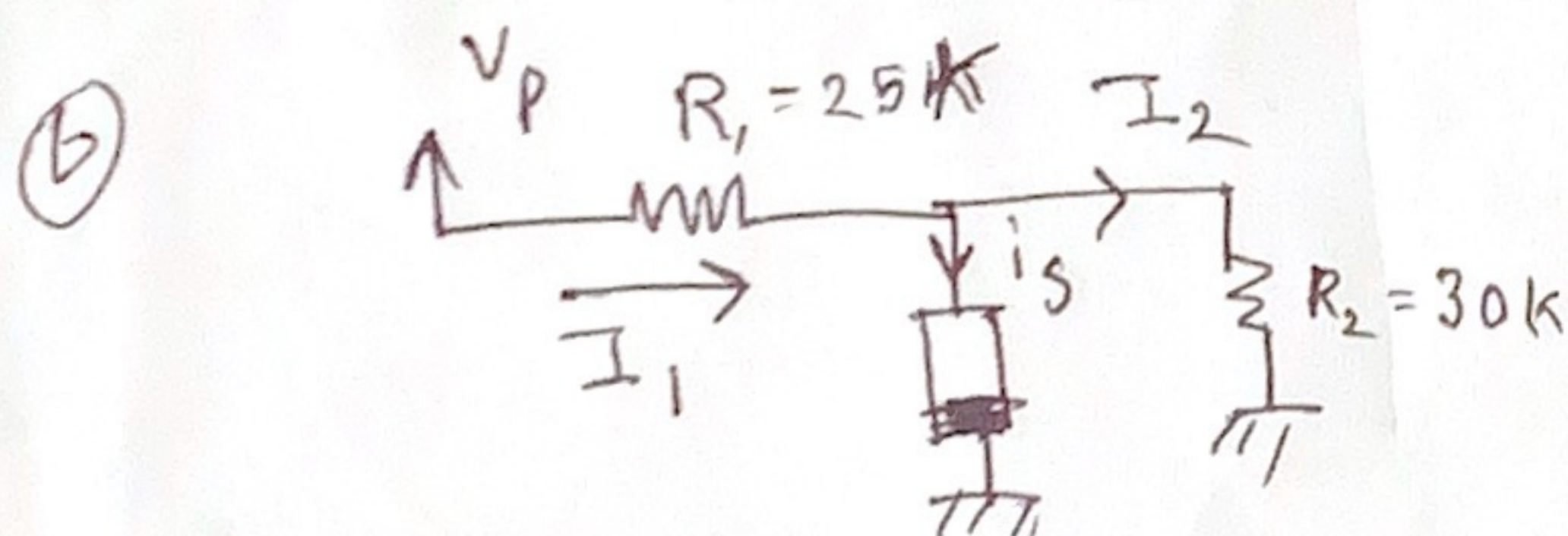
$$\underline{\underline{i_s = 1.25(V_s - 2)}}$$



$$I_0 = 1.25(5 - 2)$$

$$= 3.75mA$$

$$V_s > 5V$$



⑦ From graph, when $V_s = 3V \Rightarrow$ segment 2.

$$\text{Hence, } i_s = 1.25(V_s - 2) = \underline{\underline{1.25mA}}$$

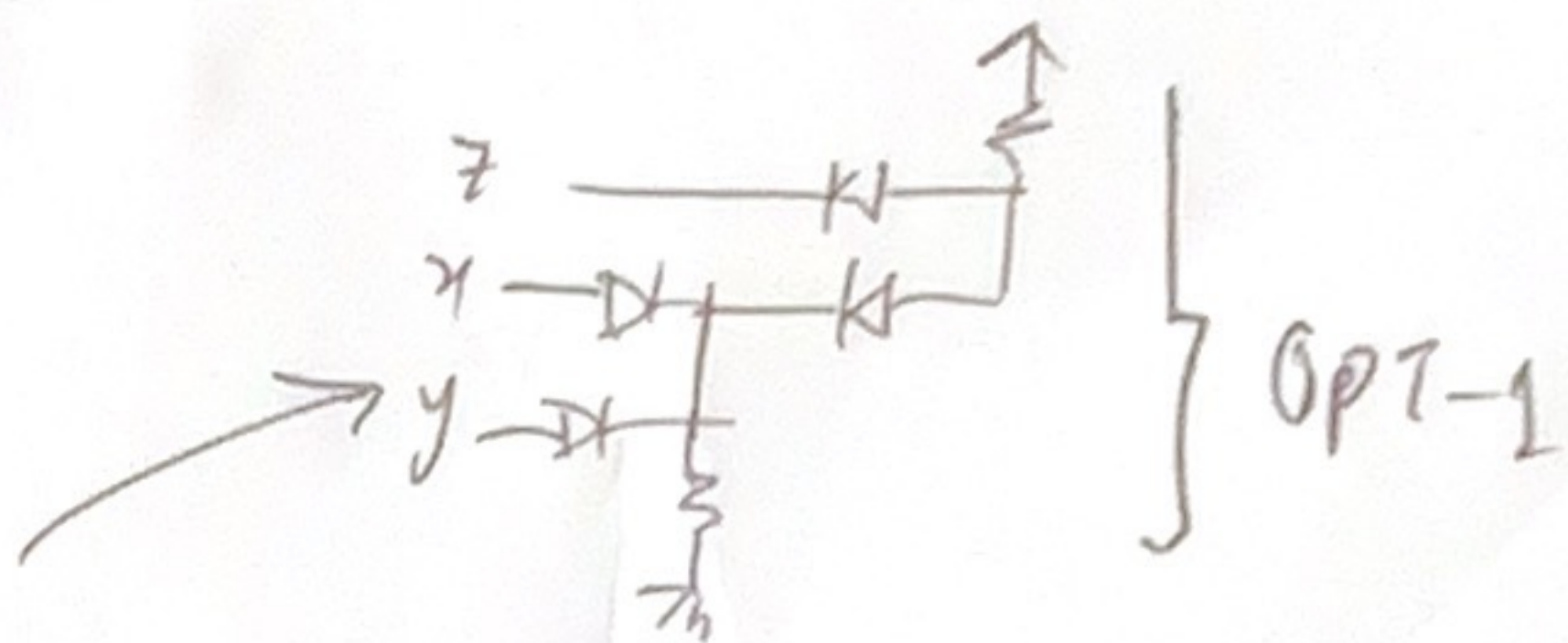
⑧ KCL $\Rightarrow I_1 = i_s + I_2$ • Ohm's law $\rightarrow I_2 = \frac{V_s}{R_2} = \frac{3V}{30k} = 0.1mA$

$$= 1.25 + 0.1 = \underline{\underline{1.35mA}}$$

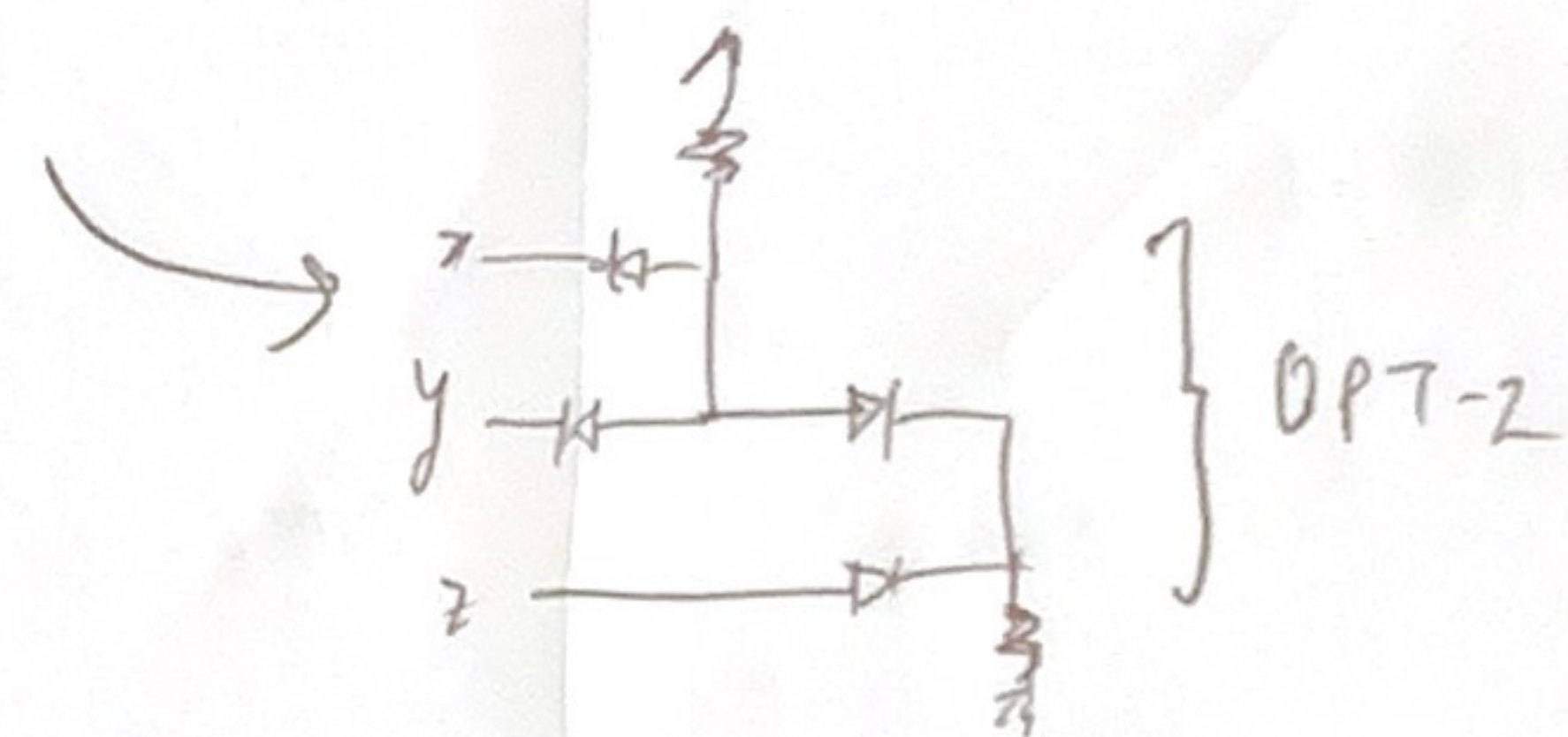
$$KVL \Rightarrow V_p = I_1 R_1 + V_s = 1.35 \times 25k + 3 = \underline{\underline{36.25V}}$$

~~Q1~~ ~~Q2~~ ~~Q3~~ ~~Q4~~ ~~Q5~~ ~~Q6~~ ~~Q7~~ ~~Q8~~ ~~Q9~~ ~~Q10~~ ~~Q11~~ ~~Q12~~ ~~Q13~~ ~~Q14~~ ~~Q15~~ ~~Q16~~ ~~Q17~~ ~~Q18~~ ~~Q19~~ ~~Q20~~ ~~Q21~~ ~~Q22~~ ~~Q23~~ ~~Q24~~ ~~Q25~~ ~~Q26~~ ~~Q27~~ ~~Q28~~ ~~Q29~~ ~~Q30~~ ~~Q31~~ ~~Q32~~ ~~Q33~~ ~~Q34~~ ~~Q35~~ ~~Q36~~ ~~Q37~~ ~~Q38~~ ~~Q39~~ ~~Q40~~ ~~Q41~~ ~~Q42~~ ~~Q43~~ ~~Q44~~ ~~Q45~~ ~~Q46~~ ~~Q47~~ ~~Q48~~ ~~Q49~~ ~~Q50~~ ~~Q51~~ ~~Q52~~ ~~Q53~~ ~~Q54~~ ~~Q55~~ ~~Q56~~ ~~Q57~~ ~~Q58~~ ~~Q59~~ ~~Q60~~ ~~Q61~~ ~~Q62~~ ~~Q63~~ ~~Q64~~ ~~Q65~~ ~~Q66~~ ~~Q67~~ ~~Q68~~ ~~Q69~~ ~~Q70~~ ~~Q71~~ ~~Q72~~ ~~Q73~~ ~~Q74~~ ~~Q75~~ ~~Q76~~ ~~Q77~~ ~~Q78~~ ~~Q79~~ ~~Q80~~ ~~Q81~~ ~~Q82~~ ~~Q83~~ ~~Q84~~ ~~Q85~~ ~~Q86~~ ~~Q87~~ ~~Q88~~ ~~Q89~~ ~~Q90~~ ~~Q91~~ ~~Q92~~ ~~Q93~~ ~~Q94~~ ~~Q95~~ ~~Q96~~ ~~Q97~~ ~~Q98~~ ~~Q99~~ ~~Q100~~

(a) Either $f = (x+y)z$



or $f = x.y + z$

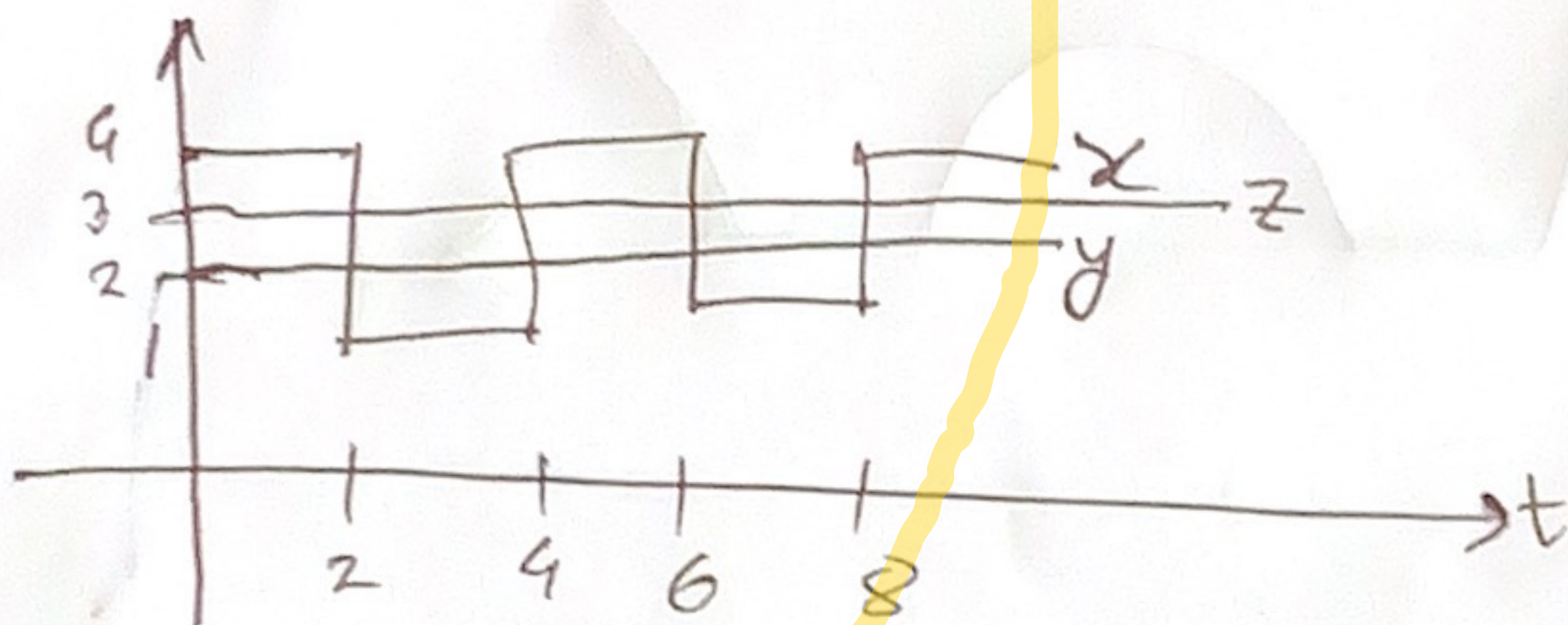


(b) for OPT-1:

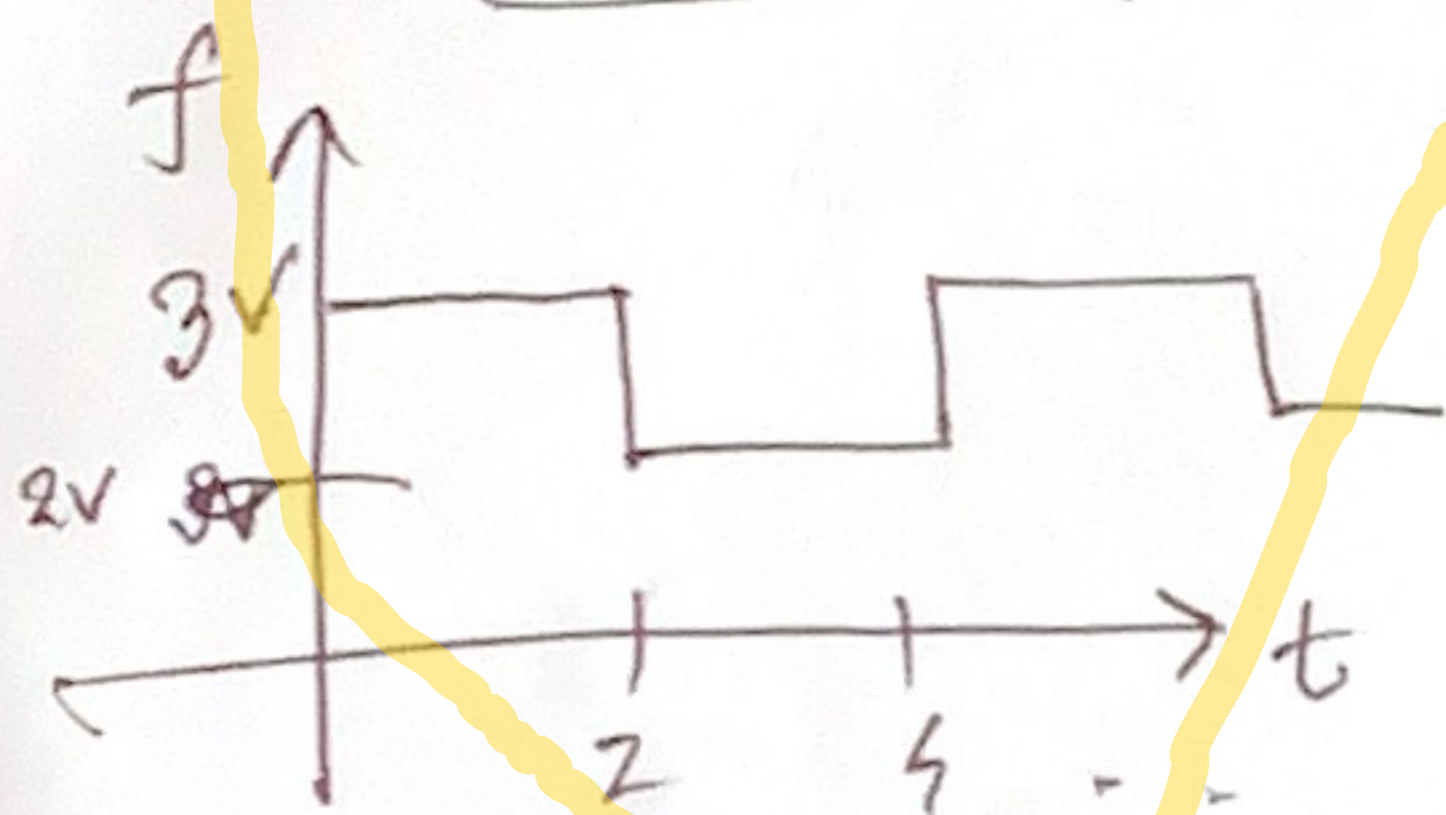
$$f = \min(\max(x, y), z)$$

for OPT-2:

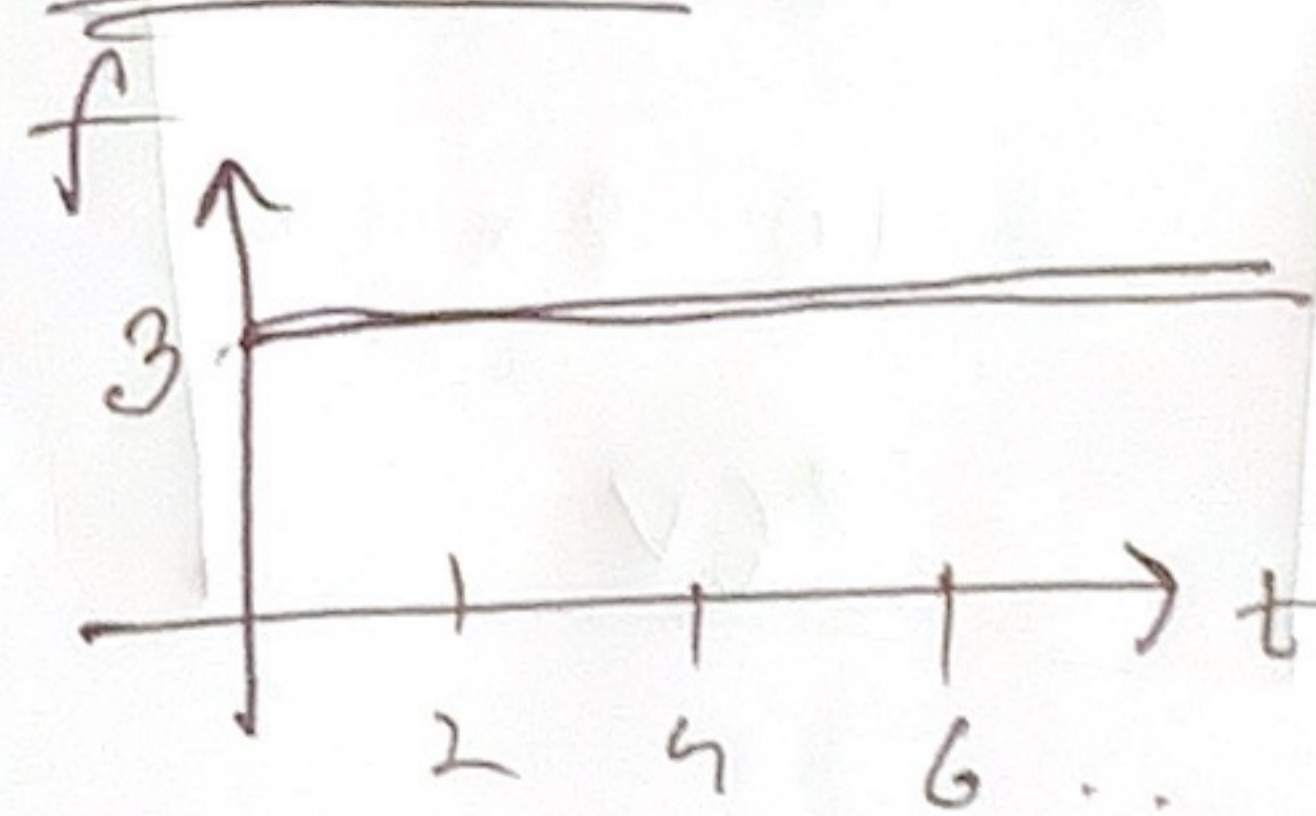
$$f = \max(\min(x, y), z)$$



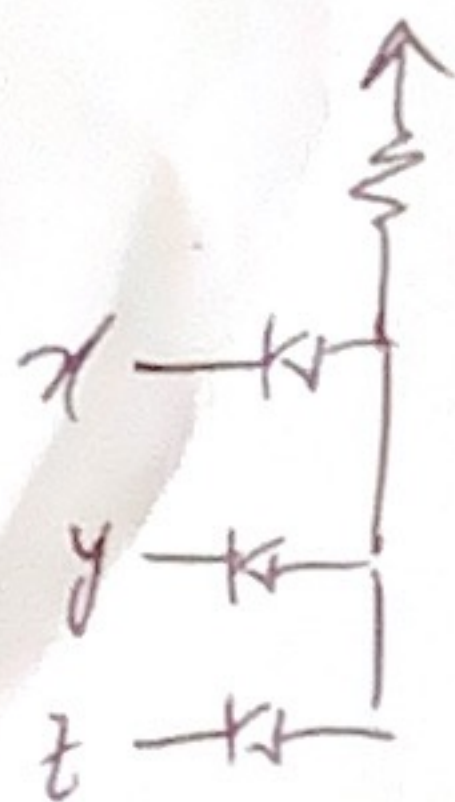
for OPT-1



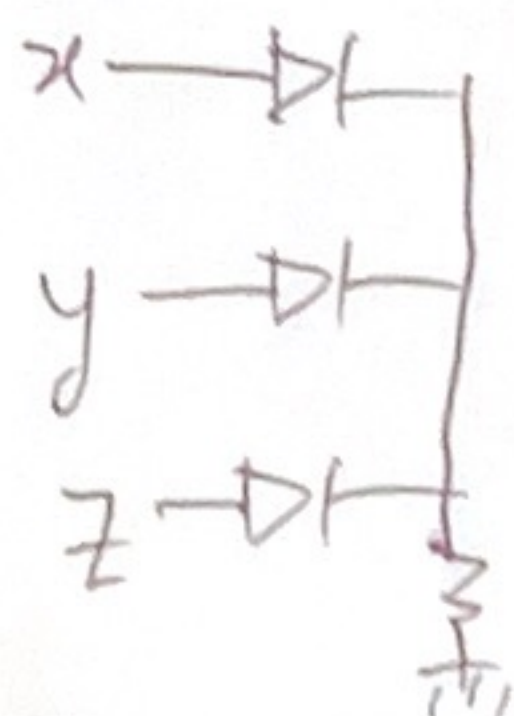
for OPT-2



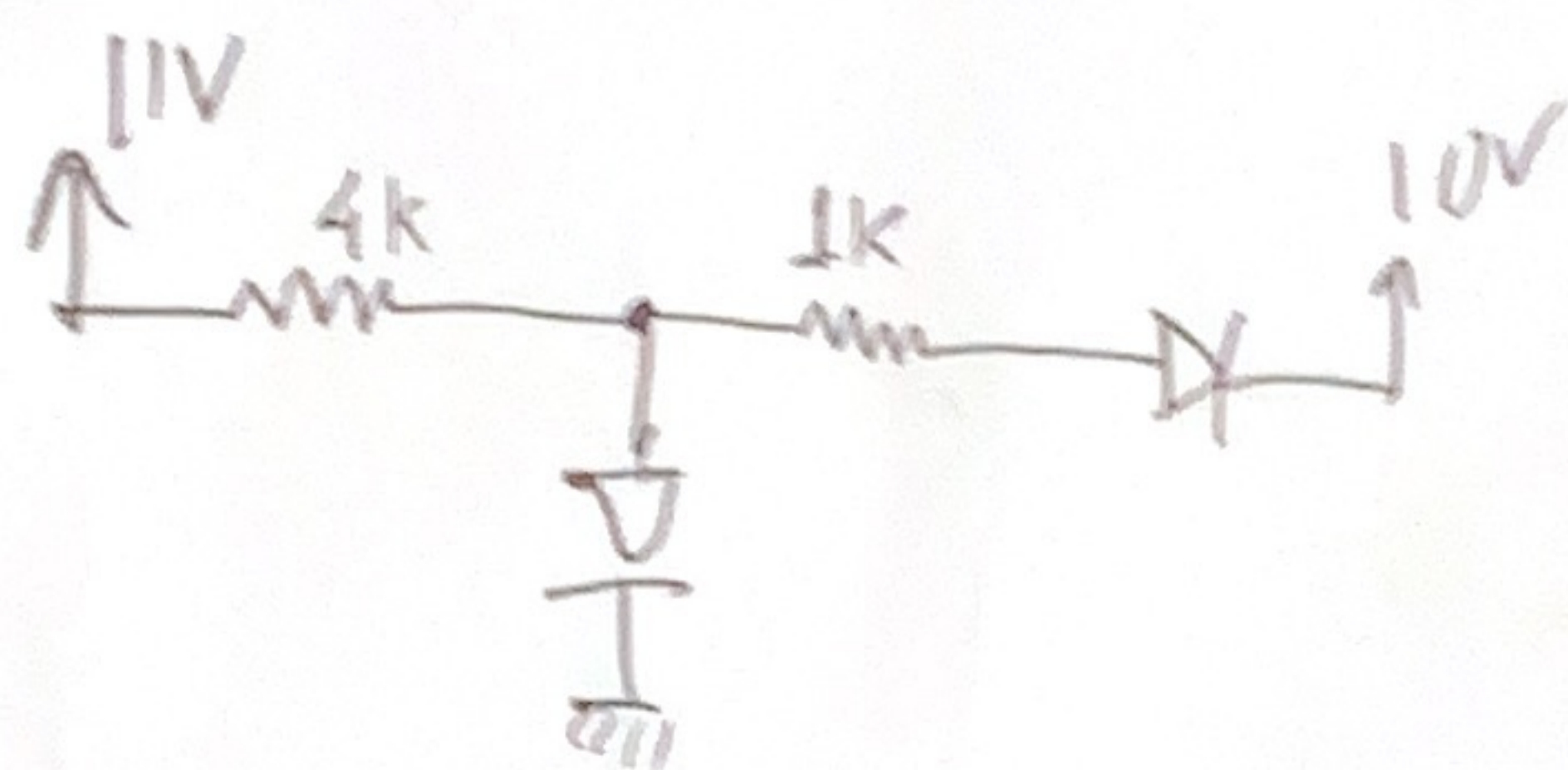
(c) $f = x.y.z$



$f = x + y + z$

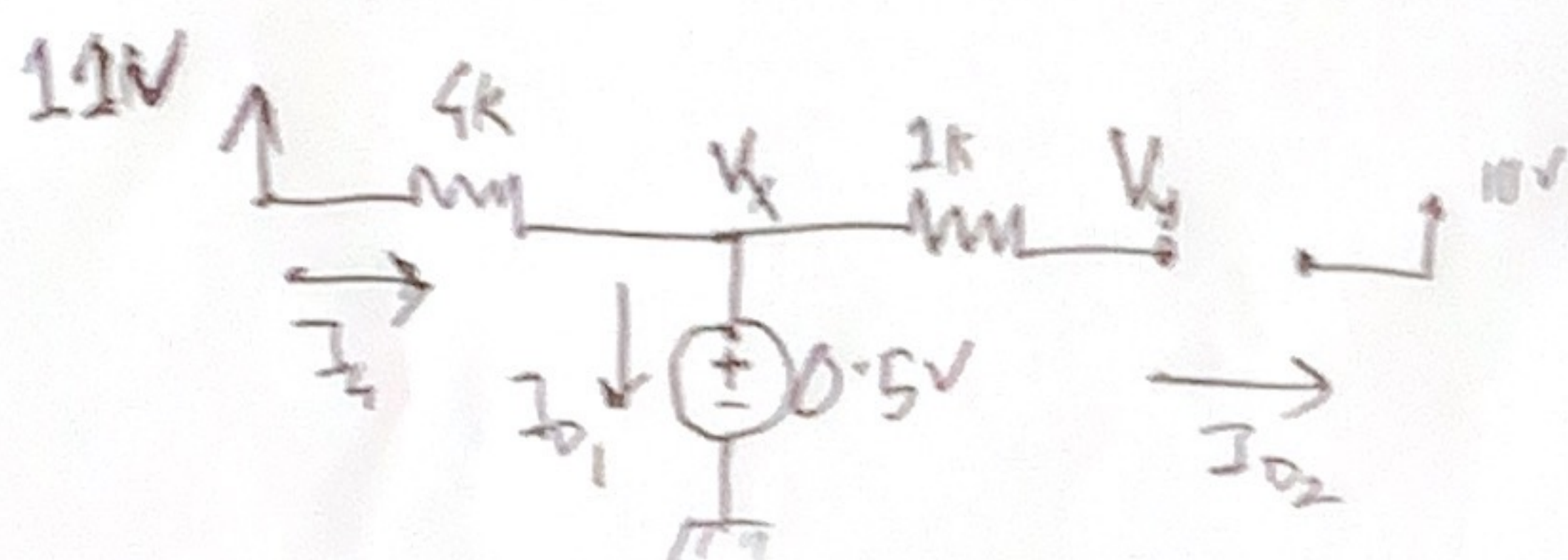


Q5



(a)

$D_1 = \text{ON}, D_2 = \text{OFF}$



$$V_x = V_y = 0.5V$$

$$I_1 = I_{D1} = \frac{11 - 0.5}{4} = 2.625 \text{ mA}$$

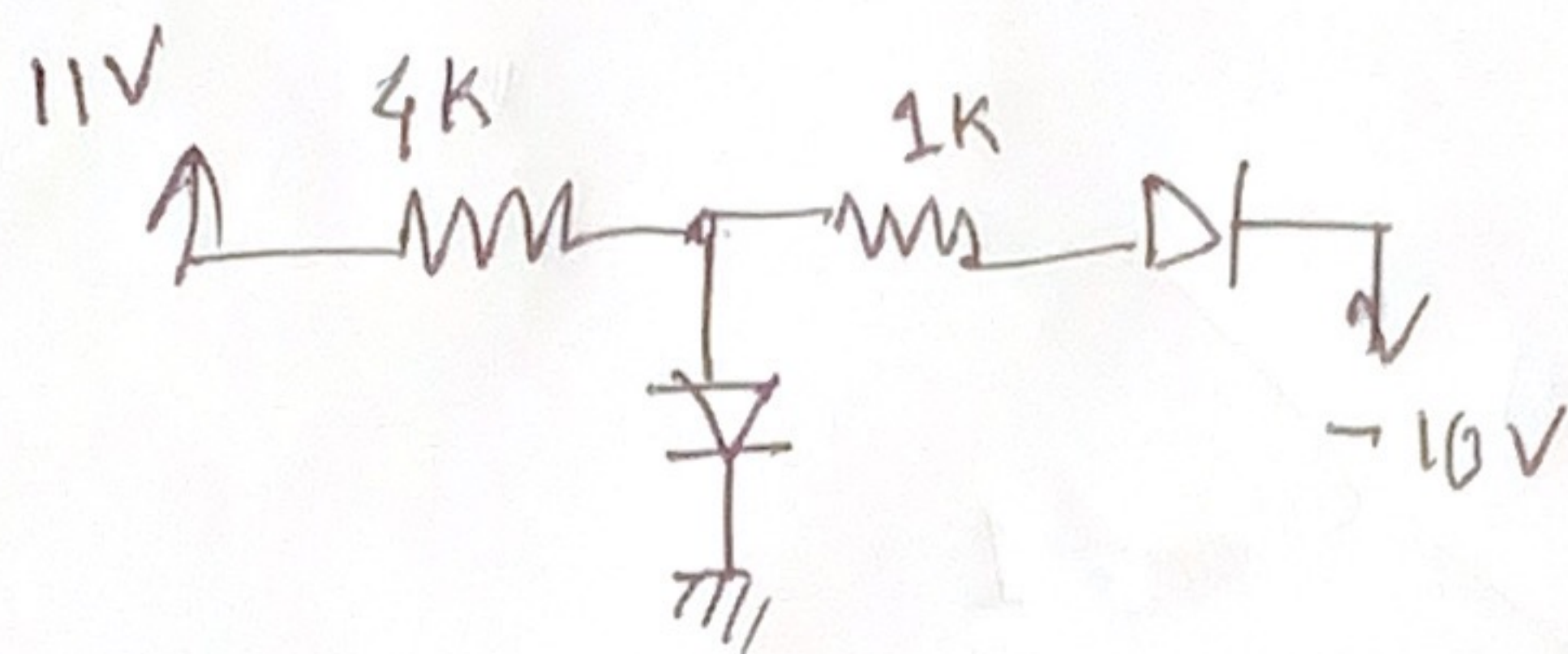
$$I_{D2} = 0$$

$$(b) D_1(\text{ON}) \Rightarrow I_{D1} > 0 \Rightarrow \text{TRUE}$$

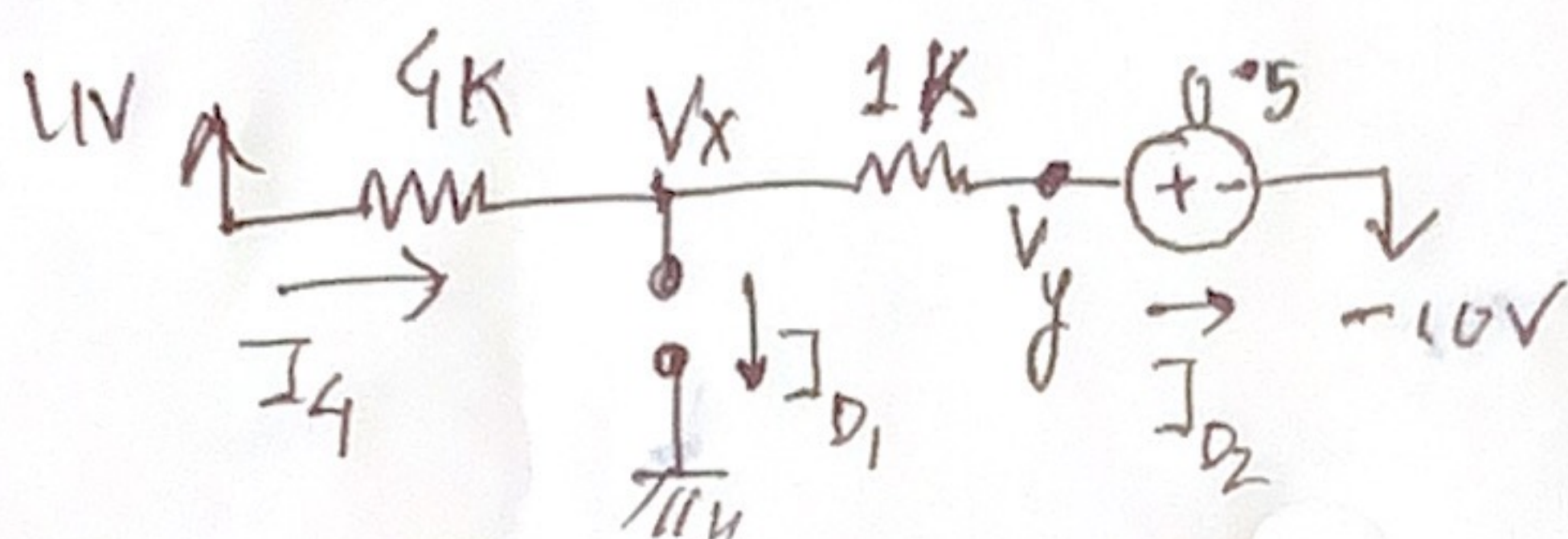
$$D_2(\text{OFF}) \Rightarrow V_{D2} = V_y - 10V = -9.5V$$

$$\therefore V_{D2} < V_{D0} \Rightarrow \text{TRUE}$$

Therefore, assumption correct!



(a) $D_1 = \text{OFF}, D_2 = \text{ON}$



$$V_y = -10 + 0.5 = -9.5\text{V}$$

$$I_{D1} = 0$$

$$I_4 = I_{D1} + I_{D2} \Rightarrow I_4 = I_{D2}$$

$$I_4 = I_{D2} = \frac{11 - (-9.5)}{4 + 1} = 4.1\text{mA}$$

$$I_4 = \frac{11 - V_x}{4} \Rightarrow V_x = 11 - I_4 \times 4$$

$$\Rightarrow V_x = -5.4\text{V}$$

(b) $D_1(\text{OFF}): V_{D1} = V_x - 0 = -5.4$

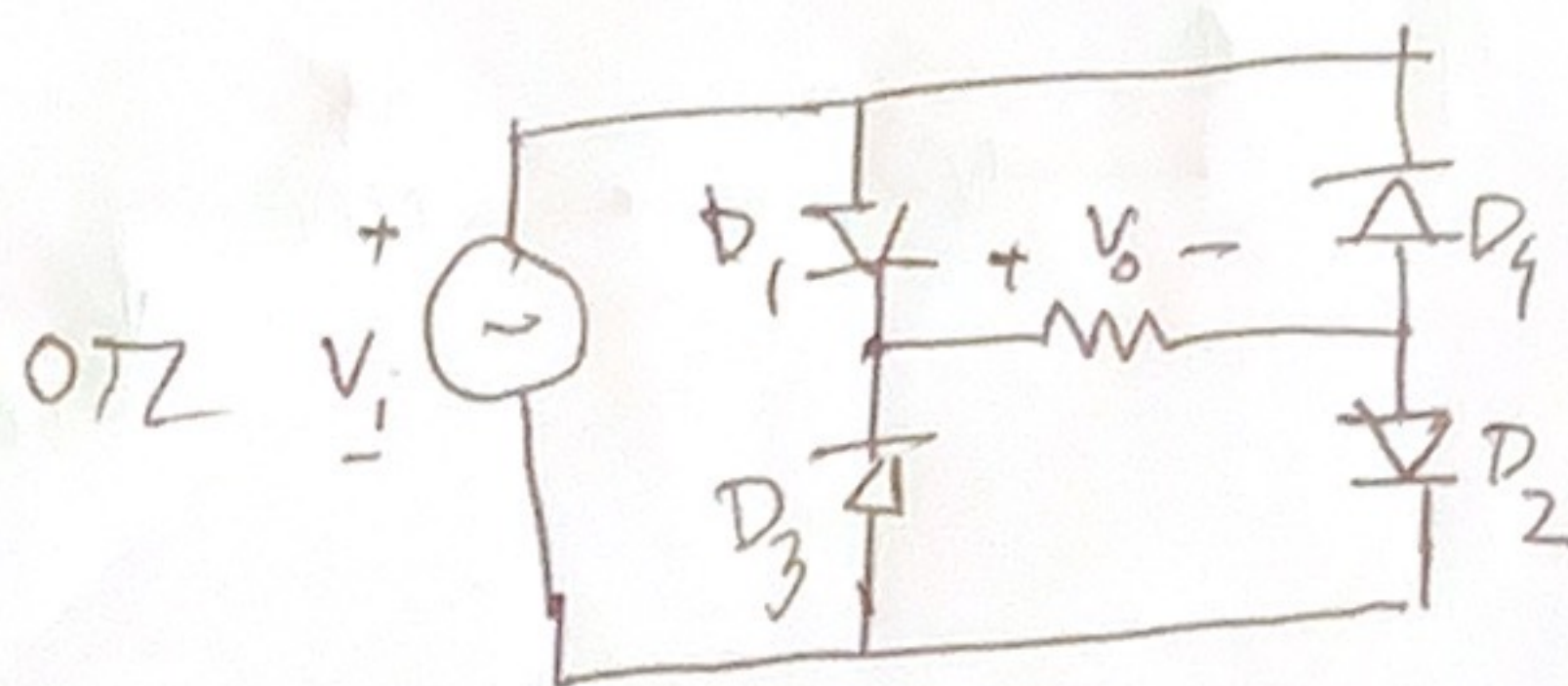
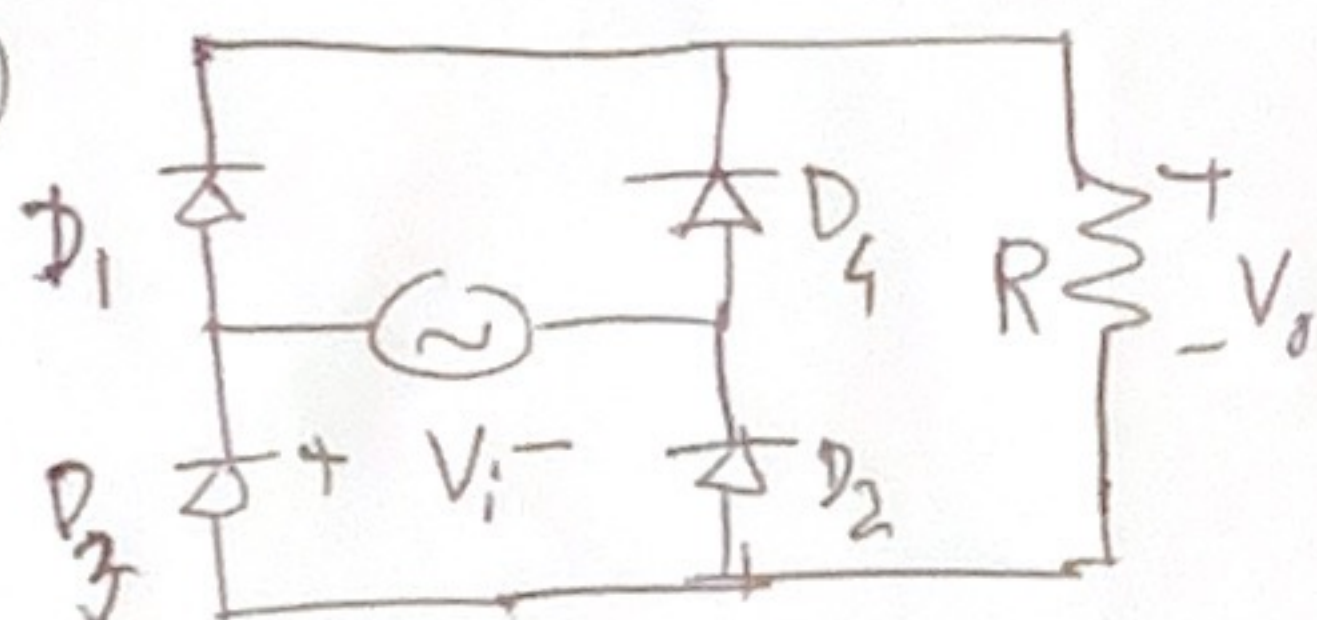
Therefore, $V_{D1} < V_{D0} \Rightarrow \text{TRUE}$

$D_2(\text{ON}): I_{D2} > 0 \Rightarrow \text{TRUE}$

} Therefore,
Assumption
Correct!

Q4

(a)



(b) $V_M = 10\text{ V}$

Hence, $V_{Avg} = V_{DC} = \frac{2}{\pi} V_M - 2V_{D0}$

$$= \frac{2}{3.14} \times 10 - 2 \times 0.7$$

$$\underline{\underline{5.37\text{ V}}} = 4.97\text{ V}$$

(c) $V_P = V_M - 2V_{D0} = 8.6\text{ V}$

$$f_R = 2f_i = \frac{2 \times 100}{2\pi} = 100\text{ Hz}$$

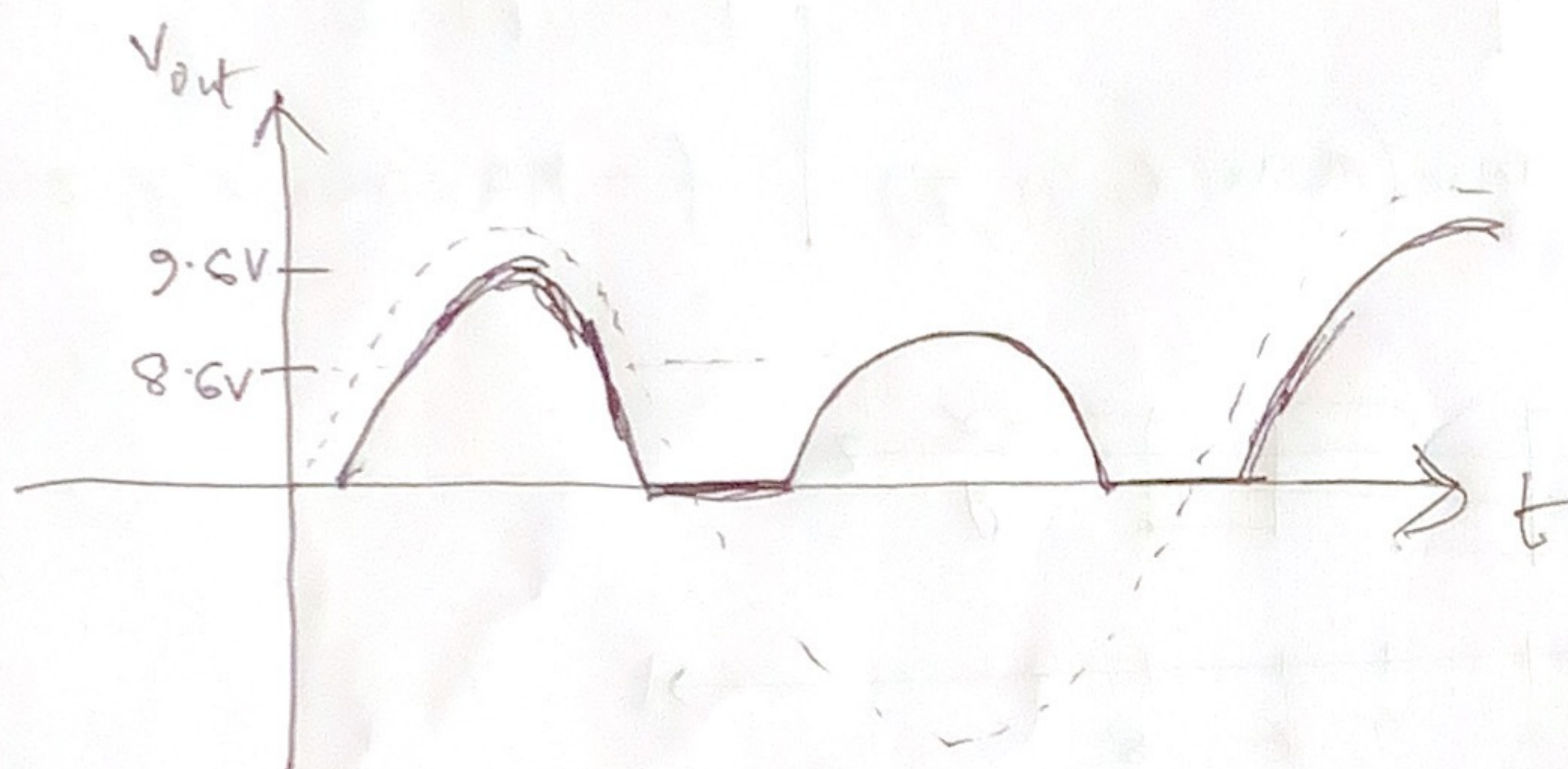
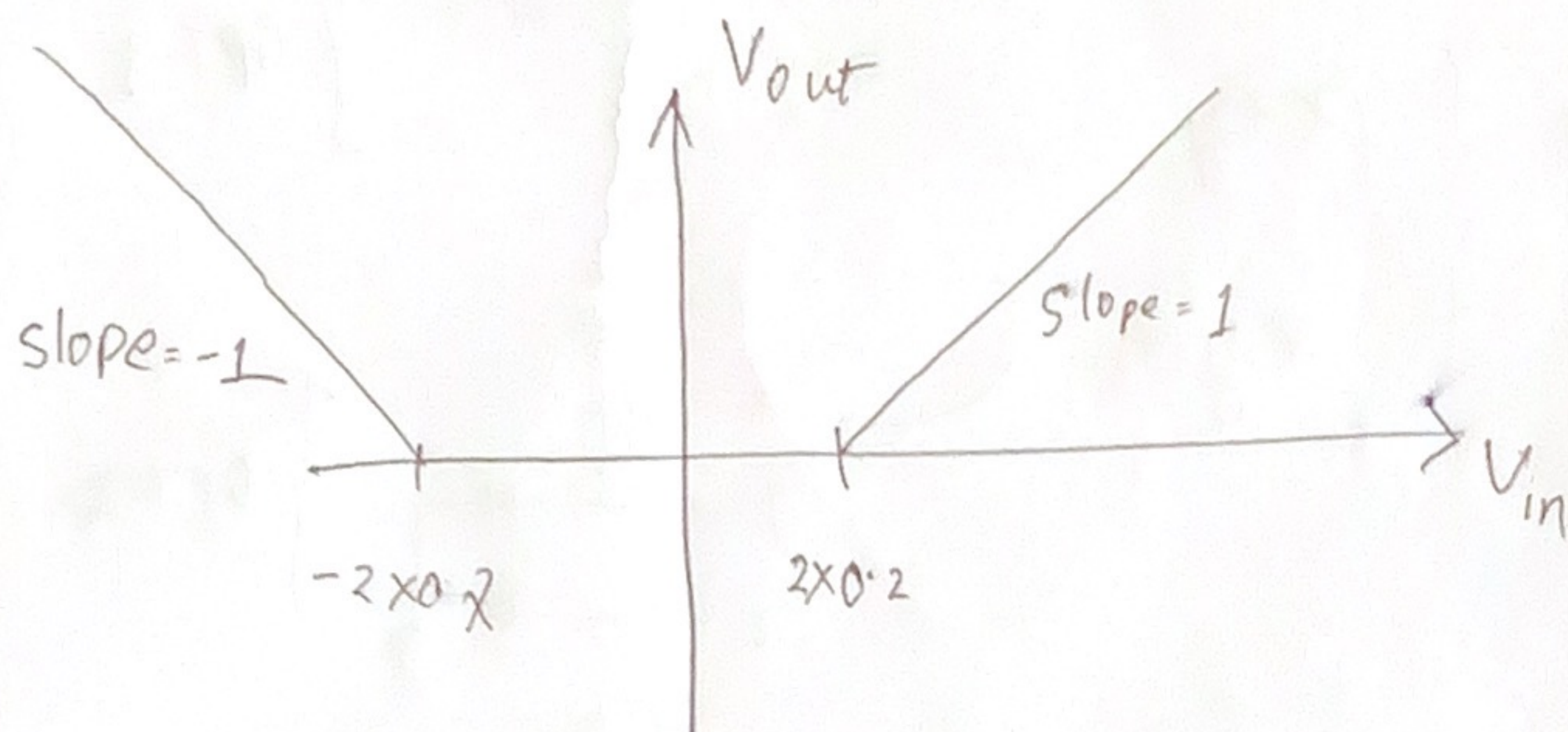
$V_P \neq \frac{V_P}{f_R RC}$

$$V_P = \frac{V_P}{f_R RC} = \frac{8.6}{100 \times 50 \times 10^3 \times 5 \times 10^{-6}} = \underline{\underline{0.344}}$$

$$\therefore V_{DC} = V_P - \frac{V_P}{2} = 8.6 - \frac{0.344}{2} = 8.428\text{ V}$$

(d) D_1 and D_2 .

(e)



$$\begin{aligned} V_p' &= V_m - 2V_{D0} \\ &= 10 - 2 \times 0.2 \\ &= 9.6V \end{aligned}$$