Pk 4

1.1) $U_q = 5V$

$U_{CE} = 2,5V$

$R_C = 120\,\Omega$

$I_B = 545\,\mu A$ ✓

$I_C = 21,6\,mA$ ✓

$B = \frac{I_C}{I_B} = \underline{39,6}$ ✓

1.2) $I_{Cx} = \frac{U_q - U_{CEx}}{R_C} = \frac{5V - 0,2V}{120\,\Omega} = \underline{40\,mA}$ ✓

$I_B' = \frac{I_{Cx}}{B} \approx \frac{40\,mA}{39,6} = \underline{1,01\,mA}$

$I_{Bx} = m \cdot I_B' = 2 \cdot 1,01\,mA = \underline{2,02\,mA}$

$R_2 = \frac{U_q - U_{BEx}}{I_{Bx}} = \frac{5V - 0,7V}{2,02\,mA} = \underline{2,13\,k\Omega}$ ✓

1.3) $R_C = 120\,\Omega$ $\quad I_{Bx} = 2,02\,mA$

$I_{Cx} = 39,4\,mA$

$U_{CEx} = 0,168\,V$

$U_{BEx} > 0,77\,V$

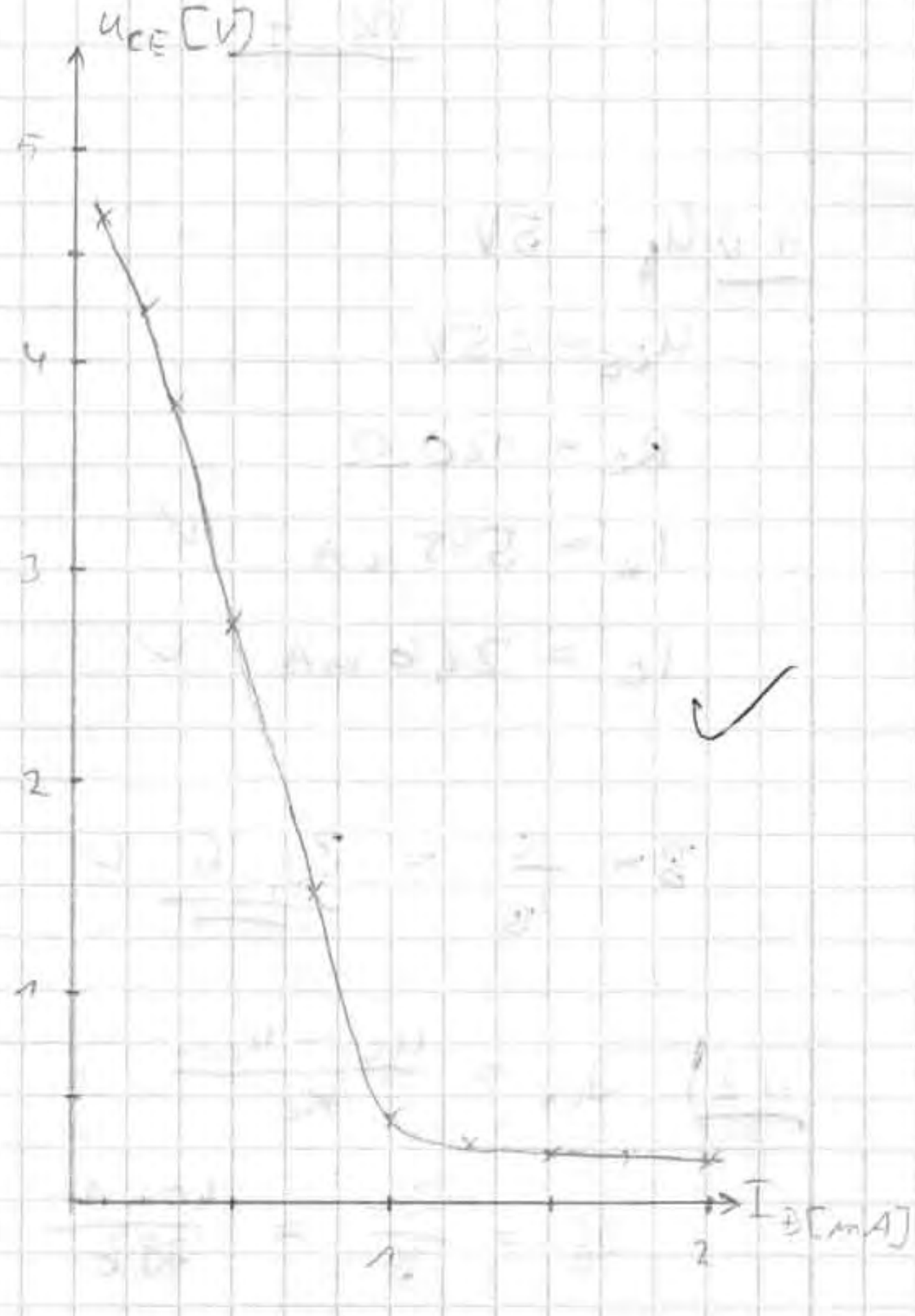
$R_2 = 2\,k\Omega$

$R_2 = \frac{U_q - U_{BEx}}{I_{Bx}} = \underline{2016,2\,\Omega}$ ✓

Abweichung durch: Kabelwiderstand, ungenaue Messgeräte

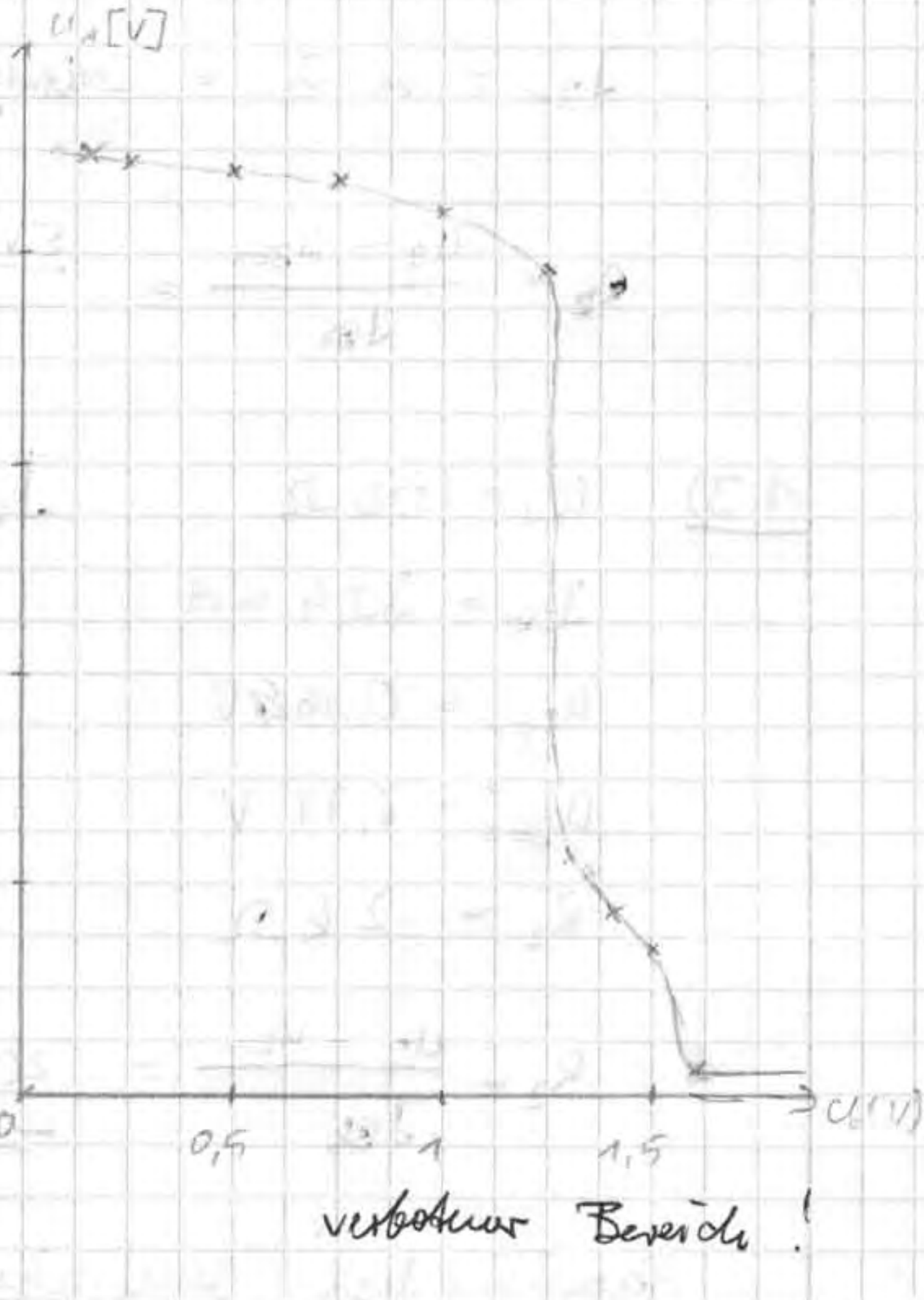
1.4)

I_B [mA]	U_{CE} [V]
0,10	4,70
0,20	4,24
0,30	3,78
0,50	2,74
0,75	1,47
1,00	0,38
1,25	0,27
1,50	0,24
1,75	0,23
2,00	0,21



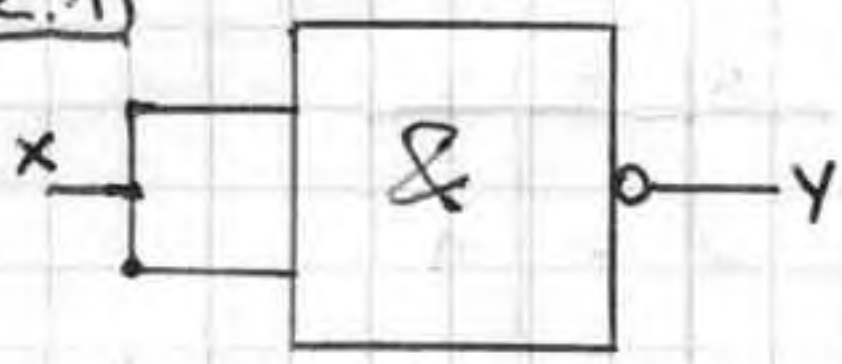
1,5)

U_e [V]	U_A [V]
0,15	4,48
0,25	4,44
0,50	4,39
0,75	4,30
1,00	4,19
1,25	3,93
1,30	1,19
1,35	1,04
1,40	0,84
1,50	0,70
1,60	0,10



verbotener Bereich!

2.1)



x	y
0	1
1	0

$x = \bar{y}$

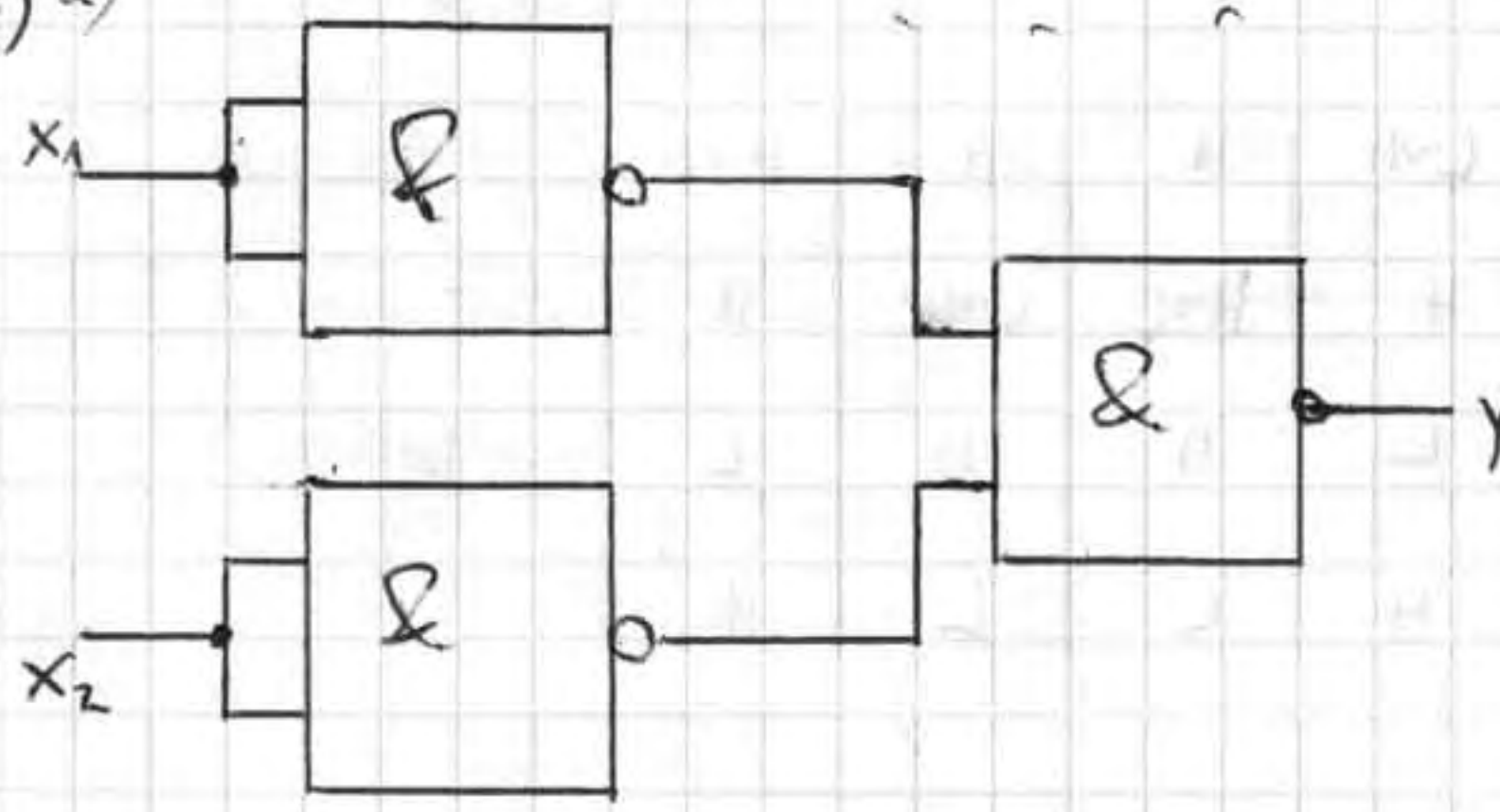
$U_{L,Eingang} = 0\,V$

$U_{H,Eingang} = 5{,}09\,V$

$0 \triangleq U_{L,Ausgang} = 0{,}08\,V$

$1 \triangleq U_{H,Ausgang} = 3{,}91\,V$

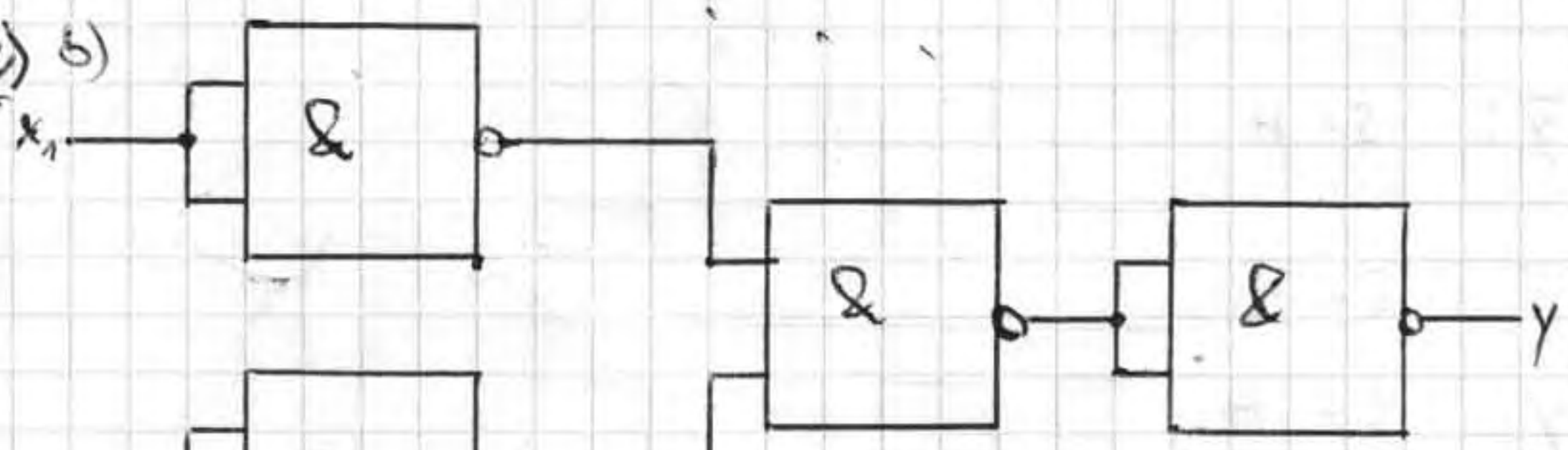
2.2) a)



x_1	x_2	y
L	L	L
L	H	H
H	L	H
H	H	H

$U_{H,Ausgang} = 3{,}91\,V$

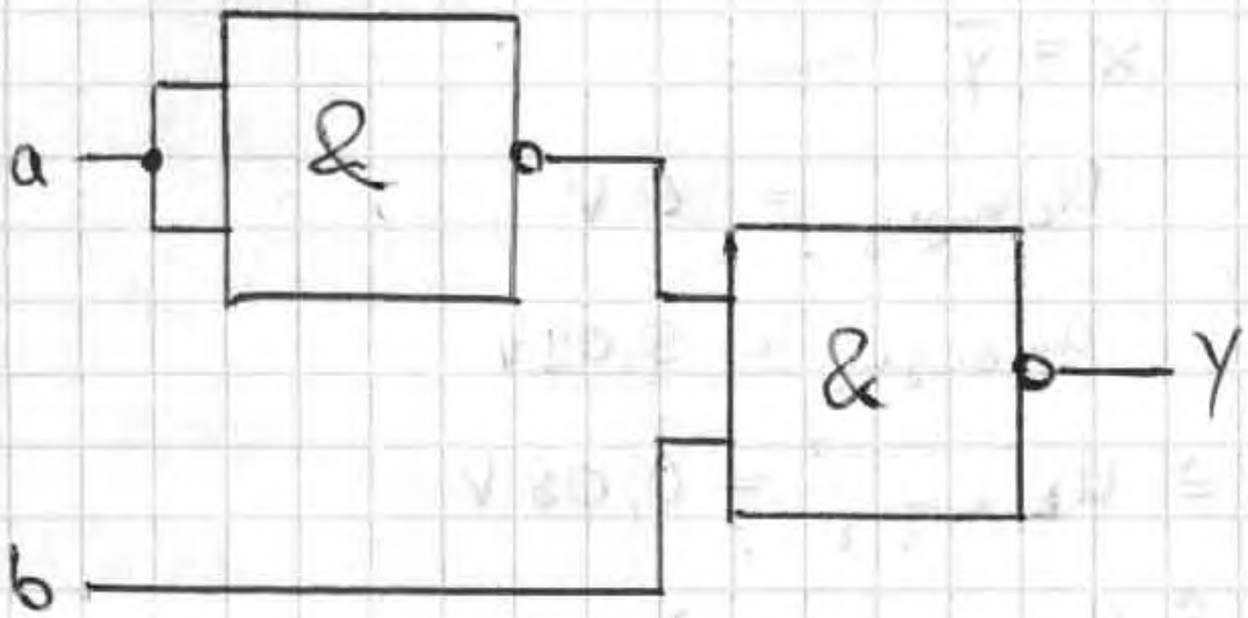
2.2) b)



x_1	x_2	y
L	L	H
L	H	L
H	L	L
H	H	L

$U_{H,Ausgang} = 3{,}91\,V$

2.3) $y = a + \overline{b}$



a	b	Y
0	0	1
1	0	1
0	1	0
1	1	1

$U_{H,Ausgang} = 3,91\,V$ ✓

3.1)

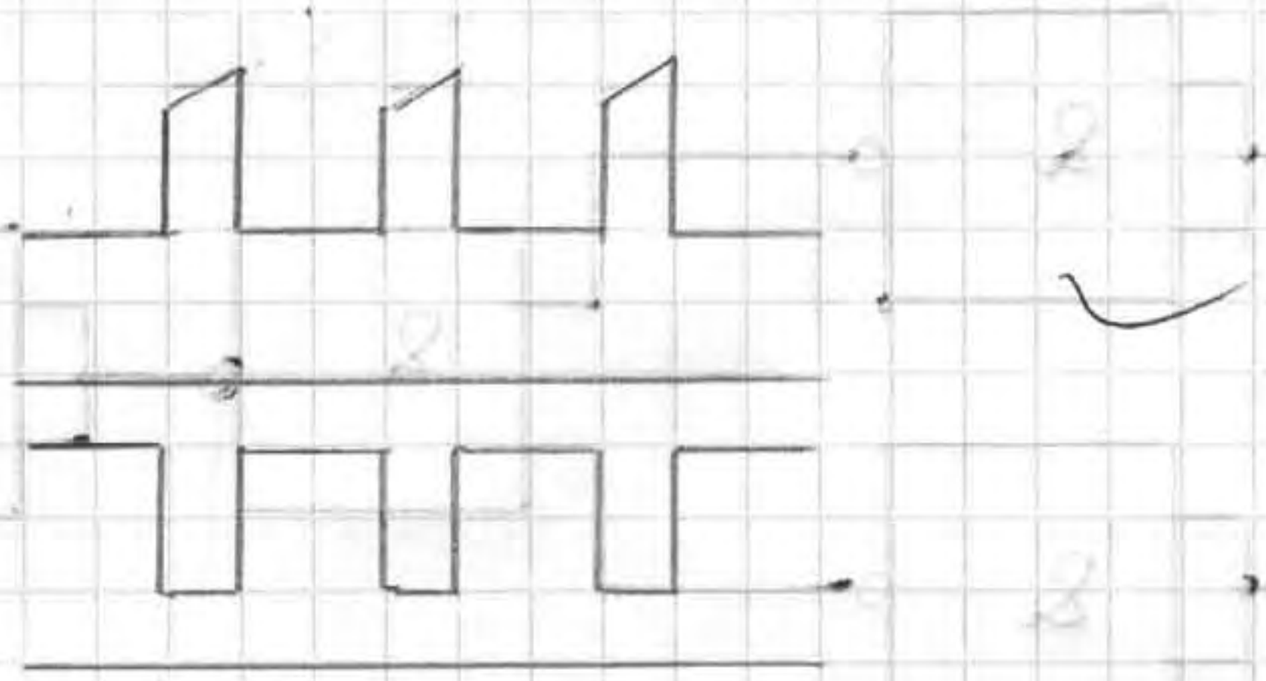
R	L	L→H	H	H	H→L
S	H	H	H→L	L→H	H
Q	L	L	H	H	L
$\overline{Q}$	H	H	L	L	H

✓

3.2) $R = 220\,\Omega$ $C = 1,0\,\mu F$ $\int \approx \frac{1}{2 \cdot R \cdot C} = 2,3\,kHz$

für $\overline{Y}$: $S = H \rightarrow \overline{Y} = $ Takt.
$S = L \rightarrow$ kein Takt

für Y: $S = H \rightarrow$ Takt
$S = L \rightarrow$ kein Takt



✓

3.3) für x_1: x_1 = Takt x_2 = nichts

y = Takt

mit x_2: x_1 = Takt x_2 = High

y = Takt

x_1 = Takt x_2 = Low

y = kein Takt

3.4) $t_i = R \cdot C$

R = 10 kΩ C = 470 µF

$t_i = 10\,k\Omega \cdot 470\,\mu F$

$t_i = 4{,}7$ s

4.1

E1	E2	E3	A
0	0	0	1
1	0	0	1
0	1	0	1
1	1	0	1
0	0	1	1
1	0	1	1
0	1	1	1
1	1	1	0

U_A für 0: 0,18 V

1: 4,48 V

$\overline{E1 \wedge E2 \wedge E3} = A$