(1) ПРЕТПОСТАВИМО ДА ОБЕ ДИОДЕ ВОДЕ

$\Rightarrow V_B = 0$ (B → ЧВОР НА КАТОДАМА ДИОДА)

$V = 0$

СТРУЈА КРОЗ D_2: $I_{D_2} = \frac{10-0}{10} = 1mA$

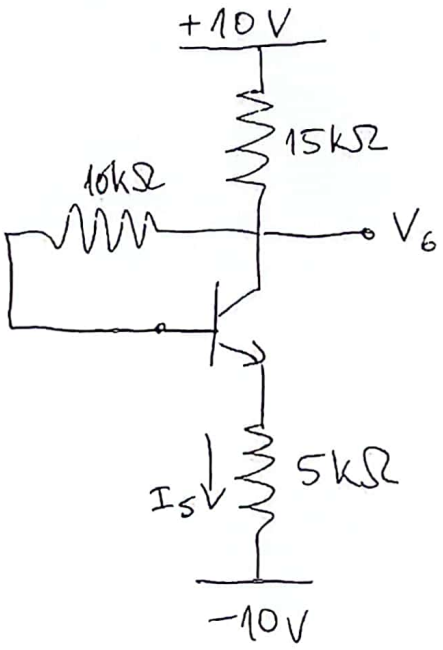
* mA и kΩ

ЧВОР B: $I + 1 = \frac{0-(-10)}{5}$

$I = 1mA$

ПРЕТПОСТАВКА ЈЕ ДОБРА $\Rightarrow$ $V = 0$ $I = 1mA$

2. НАЋИ V_6 И I_5. $V_{BE} = 0{,}7$, $\beta \to \infty$



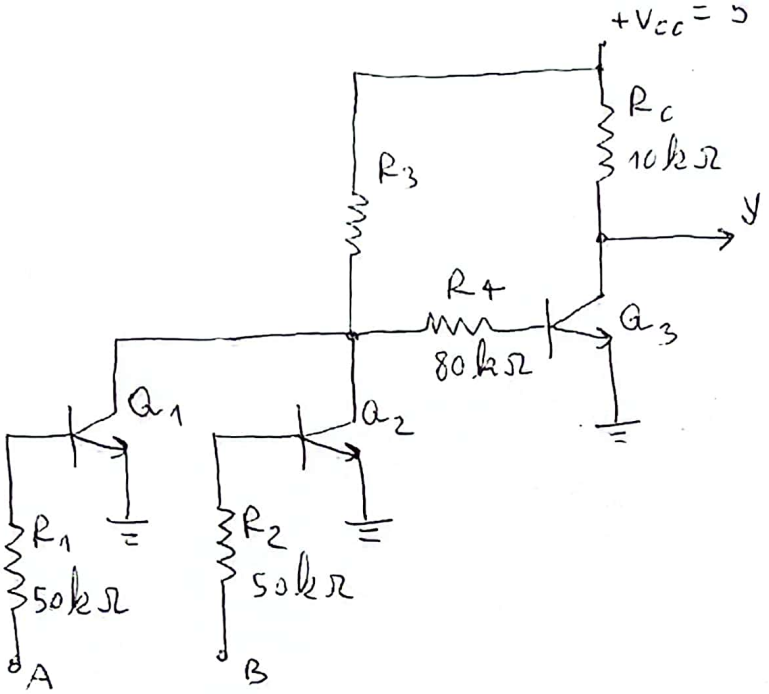
РЈЕШЕЊЕ:

$$I_C = I_E$$

$$\frac{10 - V_6}{15k} = \frac{(V_6 - 0{,}7) - (-10)}{5k} \Rightarrow 10 - V_6 = 3V_6 + 27{,}9$$

$$4V_6 = -17{,}9 \Rightarrow V_6 = -4{,}475\ V$$

$$I_C = \frac{10 - (-4{,}475)}{15k} = 0{,}965\ mA = I_E = I_5$$



a)

A	B	y
0	0	0
0	1	1
1	0	1
1	1	1

„ИЛИ" КОЛО

• $A=B=0 \Rightarrow Q_1, Q_2$ OFF $\Rightarrow Q_3$ ON $\Rightarrow V_{CE} = V_{CES} = 0,2\,V \Rightarrow y = 0$

• $A=1 \vee B=1 \Rightarrow Q_1$ ON $\vee$ Q_2 ON $\Rightarrow V_{cQ_2} = V_{cQ_1} = V_{CES} = 0,2\,V \Rightarrow Q_3$ OFF $\Rightarrow V_{CE} = +V_{CC} \Rightarrow y = 1$

b) $V_A = V_B = 0$

$$I_B = \frac{V_{CC} - V_{BES}}{R_3 + R_4}\,; \quad I_{CS} = \frac{V_{CC} - V_{CES}}{R_C}\,, \quad I_{BS} = \frac{I_{CS}}{\beta_{min}} = \frac{V_{CC} - V_{CES}}{\beta_{min} R_C}$$

$$I_B \geq I_{BS} \Rightarrow \frac{V_{CC} - V_{BES}}{R_3 + R_4} > \frac{V_{CC} - V_{CES}}{\beta_{min} R_C}$$

$$\frac{1}{R_3 + R_4} > \frac{V_{CC} - V_{CES}}{\beta_{min} R_C (V_{CC} - V_{BES})}$$

(4)

$$R_3 + R_4 < \frac{\beta_{min} R_C (V_{CC} - V_{BES})}{V_{CC} - V_{CES}}$$

$$R_3 < \frac{\beta_{min} R_C (V_{CC} - V_{BES})}{V_{CC} - V_{CES}} - R_4 = \frac{20 \cdot 10 \cdot 10^3 \cdot 4,2}{4,8} - 80 \cdot 10^3$$

$$R_3 < 95\ k\Omega \Rightarrow \boxed{R_{3\,max} = 95\ k\Omega}$$

b) $V_A = V_{cc}$ y $V_B = V_{cc}$:

$$I_{cs} = \frac{V_{cc} - V_{CES}}{R_3} \quad ; \quad I_{BS} = \frac{I_{cs}}{\beta_{min}} = \frac{V_{cc} - V_{CES}}{\beta_{min} R_3}$$

$$I_B = \frac{V_{cc} - V_{BES}}{R_1}$$

$$I_B > I_{BS} \Rightarrow \frac{V_{cc} - V_{BES}}{R_1} > \frac{V_{cc} - V_{CES}}{\beta_{min} R_3}$$

(4)

$$\frac{V_{cc} - V_{BES}}{R_1 (V_{cc} - V_{CES})} > \frac{1}{\beta_{min} R_3}$$

$$\beta_{min} R_3 > \frac{R_1 (V_{cc} - V_{CES})}{V_{cc} - V_{BES}}$$

$$R_3 > \frac{R_1 (V_{cc} - V_{CES})}{\beta_{min} (V_{cc} - V_{BES})} = \frac{50 \cdot 10^3 \cdot 4{,}8}{20 \cdot 4{,}2}$$

$$R_3 > 2{,}857\ k\Omega \Rightarrow \boxed{R_{3min} = 2{,}857\ k\Omega}$$

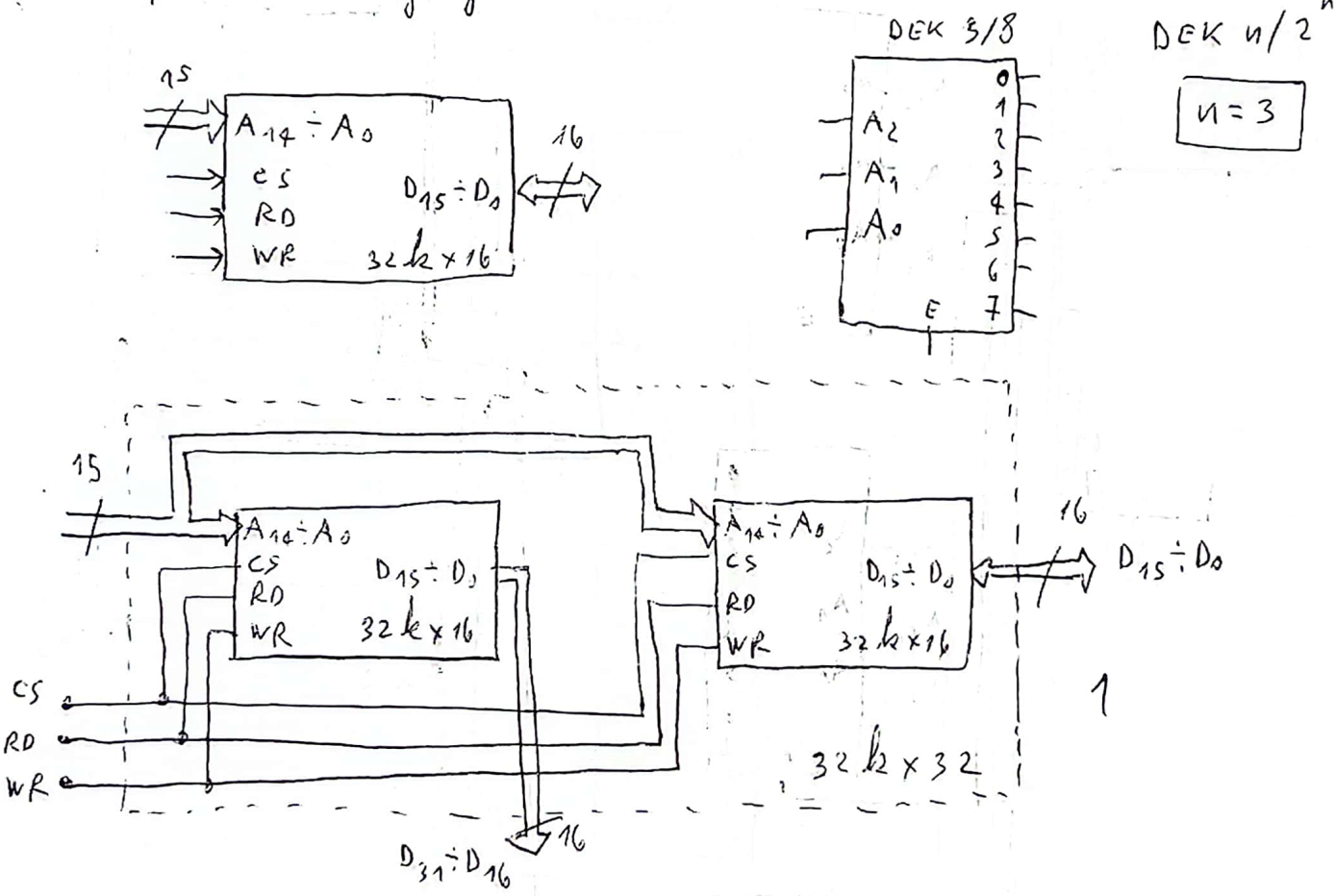
③ 1024 k × 32 , 32 k × 16 , DEK 3/8

Rjesenje:

$1024\,k = 2^{10} \cdot 2^{10} = 2^{20} \Rightarrow$ 20 adresnih vodova

$32\,k = 2^{5} \cdot 2^{10} = 2^{15} \Rightarrow$ 15 adresnih vodova 1

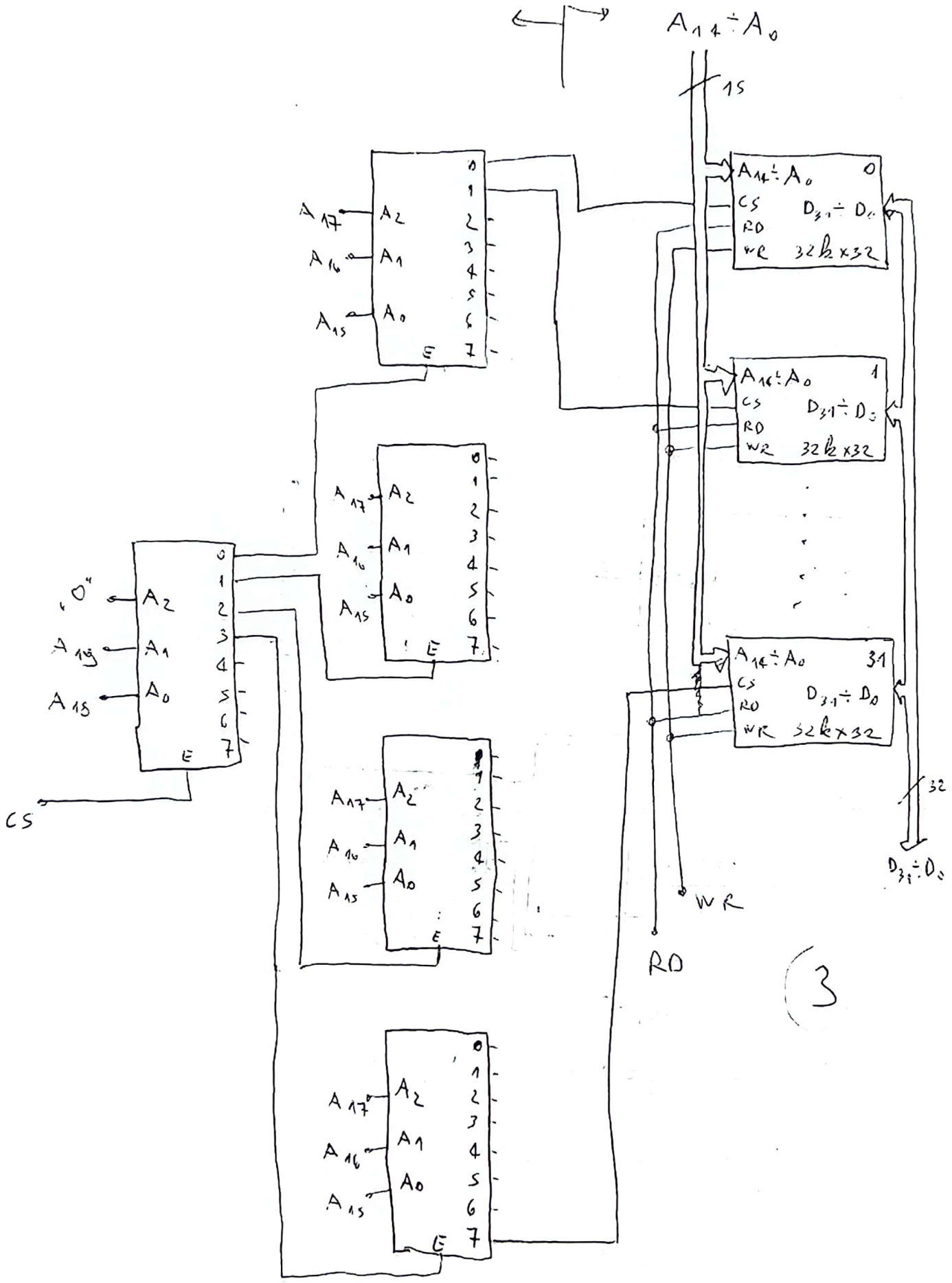
- Na ploču crtamo:



$K = \left\lceil \frac{20 - 15}{3} \right\rceil = \left\lceil \frac{5}{3} \right\rceil = 2$ ← 2 nivoa dekodera DEK 3/8

$N = \frac{1024\,k \times 32}{32\,k \times 32} = 32$ ← treba 32 komponente $32k \times 32$

$M = \left\lceil \frac{N}{2^n} \right\rceil = \left\lceil \frac{32}{8} \right\rceil = 4$ ← treba 4 dekodera u drugom nivou


A14 ÷ A0
15
A14 ÷ A0
CS
RD
WR
D31 ÷ D0
32k x 32
0
1
31
A17
A16
A15
A2
A1
A0
E
32
WR
RD
CS
3