



1.	2.	3.	Укупно

Напомене за попуњавање свих задатака:

1. Коначне одговоре уписати у означена поља
2. Не морају бити искоришћене све Карноове карте нити сви редови и колоне у таблицама
3. Неискоришћене Карноове карте и поља у таблицама прецртати

1. [5]
а)
$$f = \overline{x_1 + \overline{x_2 + \overline{x_3}} + x_2 \cdot \overline{x_3}} + \overline{(x_1 + x_2) \cdot (\overline{x_2} + x_3)} =$$
$$= \overline{x_1} \cdot (\overline{\overline{x_2 + \overline{x_3}}} + \overline{x_2 \cdot \overline{x_3}}) + \overline{(x_1 + x_2)} + \overline{(\overline{x_2} + x_3)} =$$
$$= \overline{x_1} \cdot (x_2 \cdot x_3 + \overline{x_2} \cdot \overline{x_3}) + \overline{x_1} \cdot \overline{x_2} + \overline{x_2} \cdot \overline{x_3} =$$
$$= \overline{x_1} \cdot (x_2 \cdot (x_3 + \overline{x_3})) + \overline{x_1} \cdot \overline{x_2} + \overline{x_2} \cdot \overline{x_3} =$$
$$= \overline{x_1} \cdot x_2 + \overline{x_1} \cdot \overline{x_2} + \overline{x_2} \cdot \overline{x_3} =$$
$$= \overline{x_1} \cdot (x_2 + \overline{x_2}) + \overline{x_2} \cdot \overline{x_3} =$$
$$= \overline{x_1} + \overline{x_2} \cdot \overline{x_3}$$

$$f(1) = \{0xx, x10\} = \{000, 001, 010, 011, 010, 110\} = \{0, 1, 2, 3, 6\}$$

$$f(0) = \{4, 5, 7\}$$

$$g = \overline{\overline{\overline{x_1} + x_2 + x_3} \cdot x_2 \cdot x_3 \cdot \overline{x_2} + x_3} =$$
$$= ((\overline{\overline{x_1} + x_2 + x_3}) + \overline{x_2} + \overline{x_3}) \cdot \overline{x_2} \cdot \overline{x_3} =$$
$$= (\overline{x_1} + \overline{x_2} + \overline{x_3} + x_3) \cdot \overline{x_2} \cdot \overline{x_3} =$$
$$= \overline{x_2} \cdot \overline{x_3}$$

$$g(1) = \{x00\} = \{000, 100\} = \{0, 4\}$$

$$g(0) = \{1, 2, 3, 5, 6, 7\}$$

$$\delta) f(b) = \{0, 4, 5\} \rightarrow f(1) = \{1, 2, 3, 6\}, f(0) = \{7\}$$

$$g(b) = \{0, 4, 5\} \rightarrow g(1) = \{ \}, g(0) = \{1, 2, 3, 6, 7\}$$

а) HE: $f(1) \neq g(1)$ и $f(0) \neq g(0)$

б) HE: $f(1) \neq g(1)$ и $f(0) \neq g(0)$

2. [15]

a)

	x_1x_2	00	01	11	10
x_3	0	1	0	1	1
	1	1	0	0	1

$$\begin{aligned}
 & \overline{(x_1 + x_2 + x_3)} \cdot (x_2 + x_1 \cdot \overline{x_3}) + x_1 \cdot \overline{x_3} = \\
 & = \overline{(x_1 + x_2 + x_3)} + \overline{(x_2 + x_1 \cdot \overline{x_3})} + x_1 \cdot \overline{x_3} = \\
 & = \overline{x_1} \cdot \overline{x_2} \cdot \overline{x_3} + \overline{x_2} \cdot \overline{x_1 \cdot \overline{x_3}} + x_1 \cdot \overline{x_3} = \\
 & = \overline{x_1} \cdot \overline{x_2} \cdot \overline{x_3} + \overline{x_2} \cdot (\overline{x_1} + x_3) + x_1 \cdot \overline{x_3} = \\
 & = \overline{x_1} \cdot \overline{x_2} \cdot \overline{x_3} + \overline{x_1} \cdot \overline{x_2} + \overline{x_2} \cdot x_3 + x_1 \cdot \overline{x_3}
 \end{aligned}$$

$$\begin{aligned}
 f(1) &= \{00x, x01, 1x0\} = \{000, 001, 101, 100, 110\} = \\
 &= \{0, 1, 4, 5, 6\}
 \end{aligned}$$

КНФ: $(x_1 + \overline{x_2}) \cdot (\overline{x_2} + \overline{x_3})$

б)

	x_1x_2	00	01	11	10
x_3x_4	00	0	0	0	0
	01	0	0	b	0
	11	0	0	1	1
	10	b	b	1	1

$$\begin{aligned}
 & \overline{x_1 + \overline{x_2} \cdot x_3 + \overline{x_4} + x_1 \cdot x_3} + \overline{x_1 \cdot \overline{x_4} + x_3 \cdot \overline{x_4}} = \\
 & = \overline{x_1 + \overline{x_2} \cdot x_3 + \overline{x_4} + x_1 \cdot x_3} + x_1 \cdot \overline{x_4} \cdot \overline{x_3} = \\
 & = (x_1 + \overline{x_2} + x_3 + \overline{x_4}) \cdot x_1 \cdot x_3 = \\
 & = x_1 \cdot x_3
 \end{aligned}$$

$$f(b) = \{2, 6, 13\}$$

$$\begin{aligned}
 f(1) &= \{1x1x\} = \{1010, 1011, 1110, 1111\} = \\
 &= \{10, 11, 14, 15\}
 \end{aligned}$$

ДНФ: $x_1 \cdot x_3$

в)

	x_2x_3	00	01	11	10
x_4x_5	00	1	1	b	1
	01	b		b	
	11				
	10				1

$$x_1 = 0$$

	x_2x_3	00	01	11	10
x_4x_5	00	b	b	1	b
	01	1	1	1	1
	11				
	10	1	1		b

$$x_1 = 1$$

ДНФ: $x_1 \cdot \overline{x_4} + \overline{x_4} \cdot \overline{x_5} + x_1 \cdot \overline{x_2} \cdot x_5 + x_2 \cdot \overline{x_3} \cdot \overline{x_5}$

3. [10]

Комбинациона таблица:

X_1	X_2	X_3	X_4	Z_1	Z_2	Z_3
0	0	0	0	1	0	0
0	0	0	1	0	0	1
0	0	1	0	0	1	0
0	0	1	1	0	1	0
0	1	0	0	0	0	0
0	1	0	1	0	0	0
0	1	1	0	b	b	b
0	1	1	1	b	b	b

X_1	X_2	X_3	X_4	Z_1	Z_2	Z_3
1	0	0	0	0	1	0
1	0	0	1	0	1	0
1	0	1	0	0	1	1
1	0	1	1	1	0	0
1	1	0	0	0	0	0
1	1	0	1	0	1	0
1	1	1	0	b	b	b
1	1	1	1	b	b	b

Излазни сигнал Z_1 :

X_1X_2	00	01	11	10
X_3X_4 00	1	0	0	0
01	0	0	0	0
11	0	b	b	1
10	0	b	b	0

Излазни сигнал Z_2 :

X_1X_2	00	01	11	10
X_3X_4 00	0	0	0	1
01	0	0	1	1
11	1	b	b	0
10	1	b	b	1

Излазни сигнал Z_3 :

X_1X_2	00	01	11	10
X_3X_4 00	0	0	0	0
01	1	0	0	0
11	0	b	b	0
10	0	b	b	1

ДНФ Z_1 :

$$\bar{X}_1 \cdot \bar{X}_2 \cdot \bar{X}_3 \cdot \bar{X}_4 + X_1 \cdot X_3 \cdot X_4 = (\bar{X}_1 \cdot \bar{X}_2) \cdot (\bar{X}_3 \cdot \bar{X}_4) + X_1 \cdot (X_3 \cdot X_4)$$

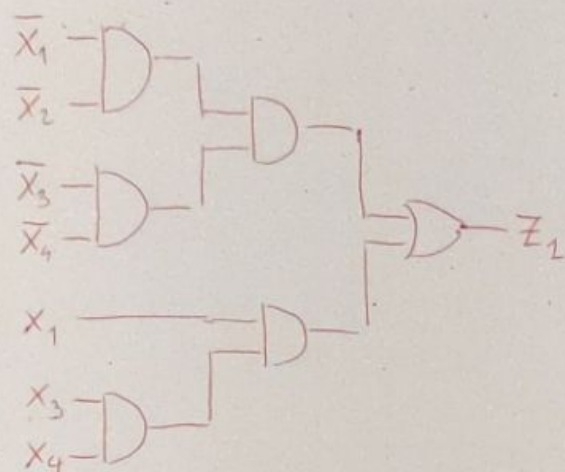
ДНФ Z_2 :

$$\bar{X}_1 \cdot X_3 + X_1 \cdot \bar{X}_3 \cdot X_4 + X_1 \cdot \bar{X}_2 \cdot \bar{X}_4 \xrightarrow{\text{ФАКТ.}} \bar{X}_1 \cdot X_3 + X_1 \cdot (\bar{X}_3 \cdot X_4 + \bar{X}_2 \cdot \bar{X}_4)$$

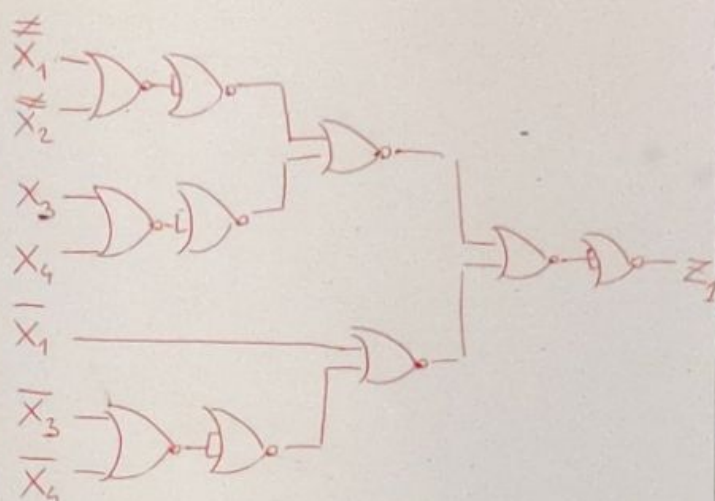
ДНФ Z_3 :

$$\bar{X}_1 \cdot \bar{X}_2 \cdot \bar{X}_3 \cdot X_4 + X_1 \cdot X_3 \cdot \bar{X}_4 = (\bar{X}_1 \cdot \bar{X}_2) \cdot (\bar{X}_3 \cdot X_4) + X_1 \cdot (X_3 \cdot \bar{X}_4)$$

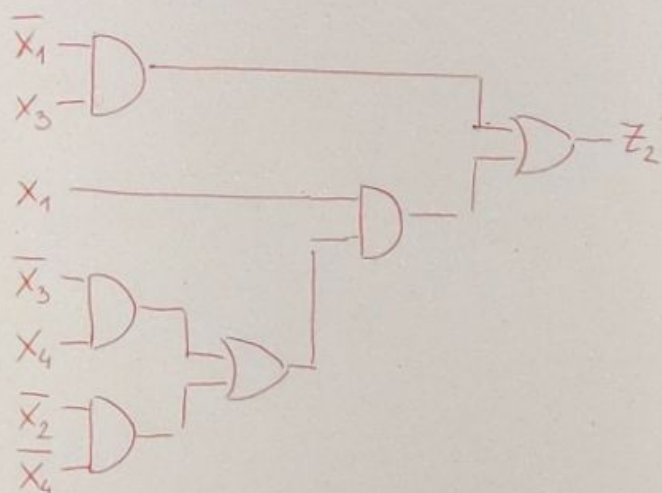
Шема Z_1 (И, ИЛИ)



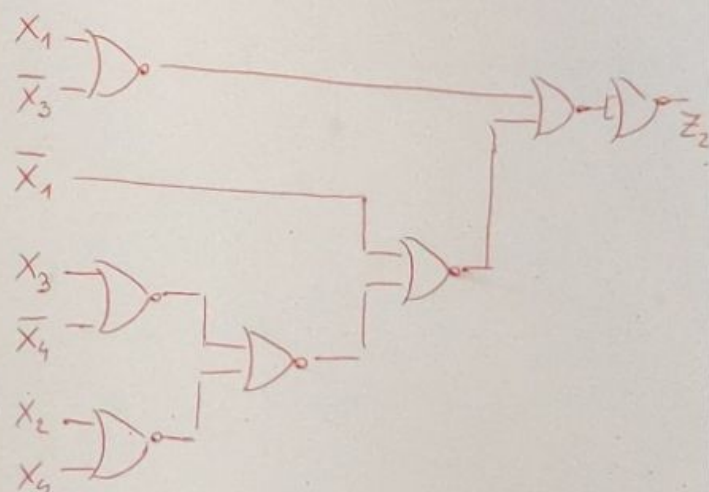
Шема Z_1 (НИЛИ)



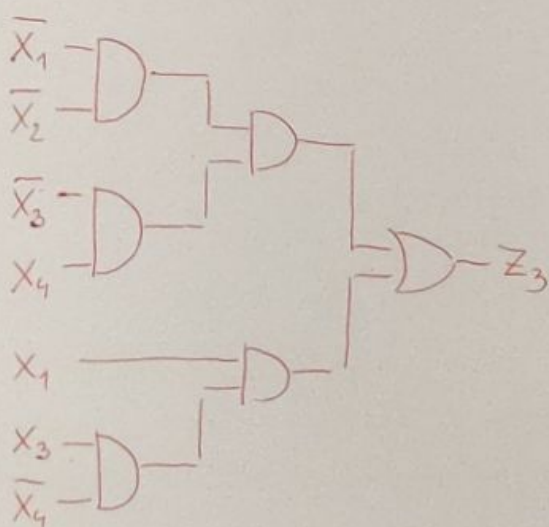
Шема Z_2 (И, ИЛИ)



Шема Z_2 (НИЛИ)



Шема Z_3 (И, ИЛИ)



Шема Z_3 (НИЛИ)

