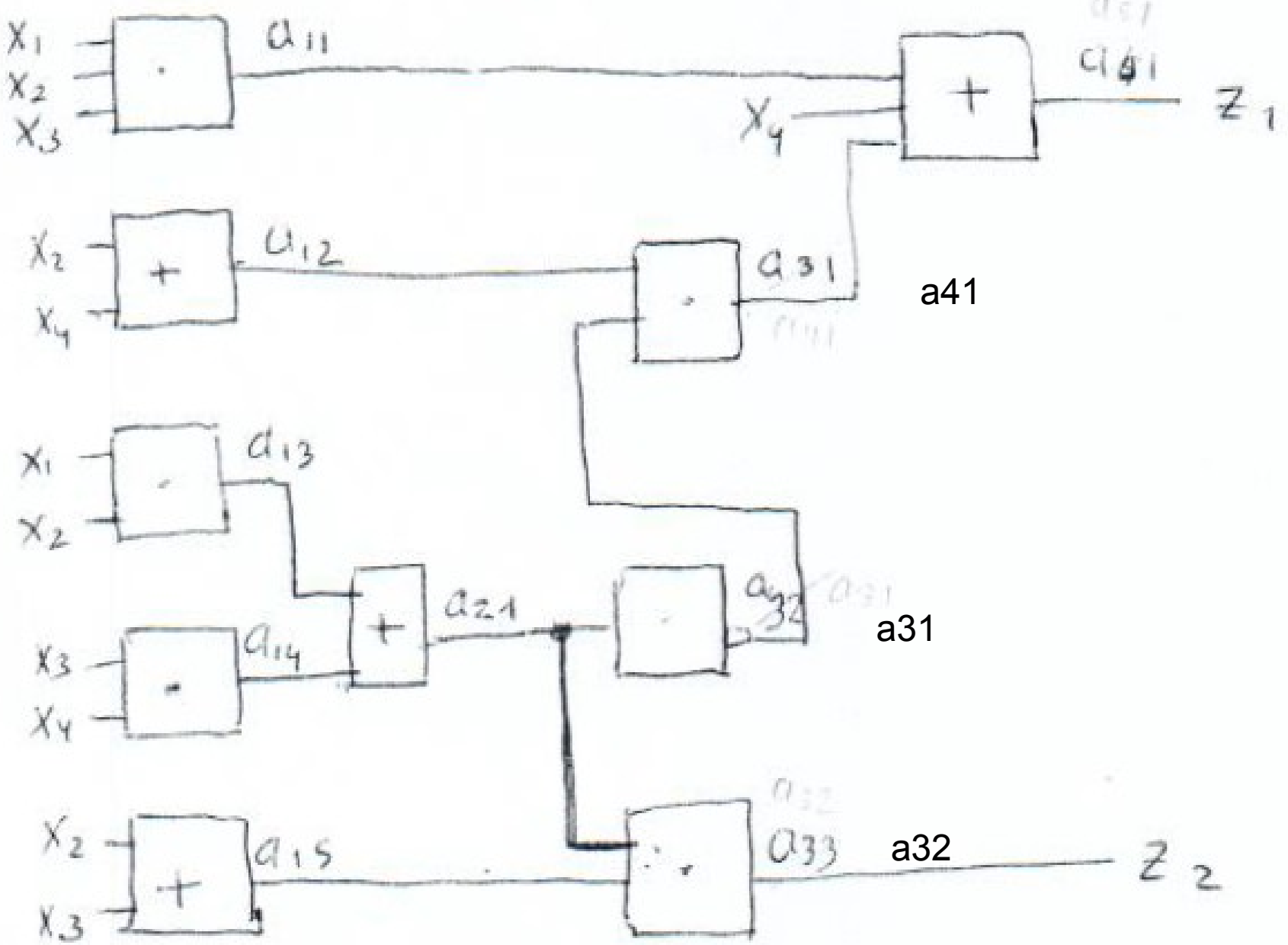
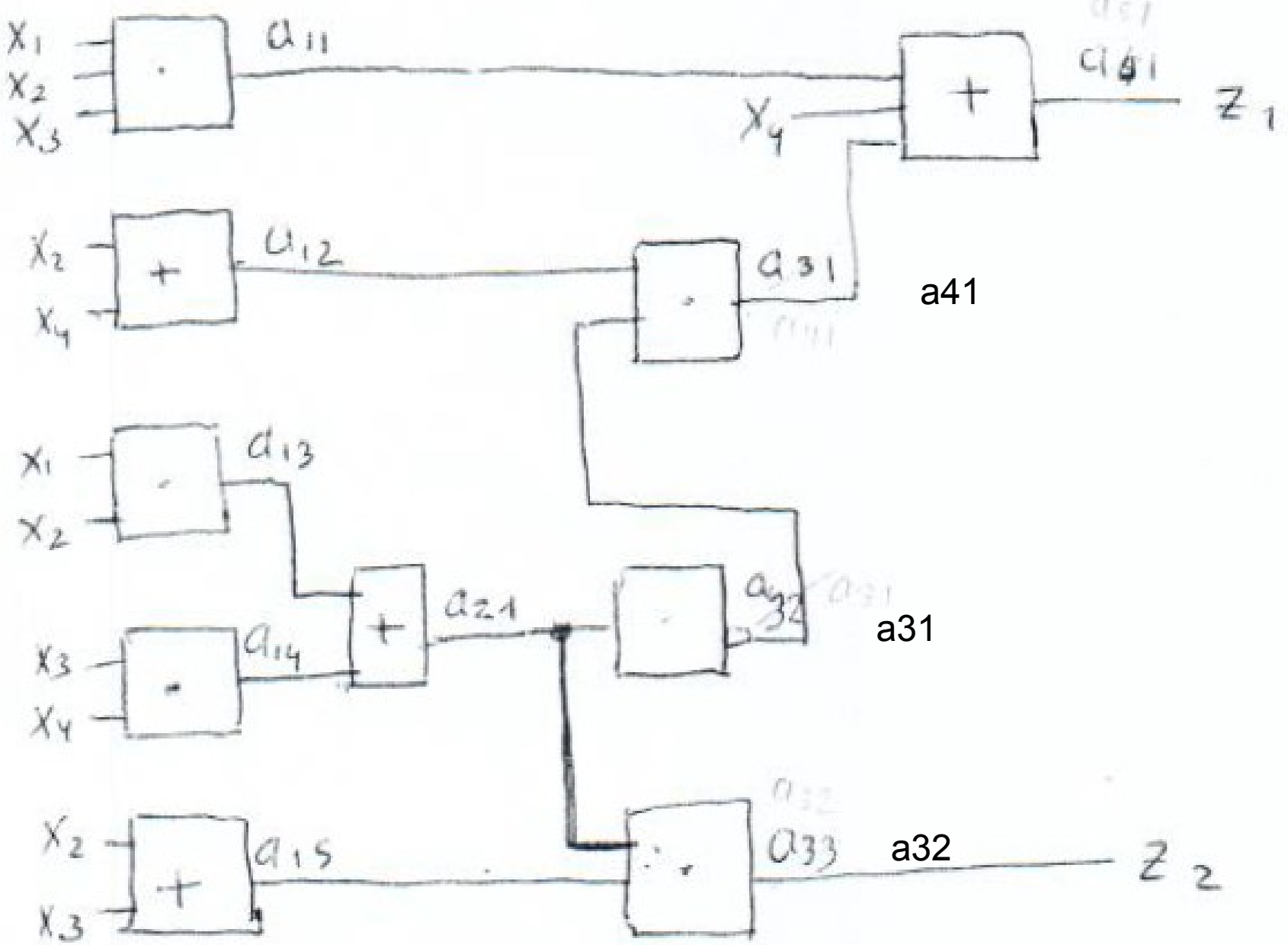

X1
X2
X3
a11
X4
a41
Z1
X2
X4
a12
a31
a41
X1
X2
a13
a21
a31
X3
X4
a14
a32
X2
X3
a15
a33
a32
Z2


X1
X2
X3
a11
X4
a41
Z1
X2
X4
a12
a31
a41
X1
X2
a13
a21
a31
X3
X4
a14
a32
X2
X3
a15
a33
a32
Z2

$a_{11} = x_1 x_2 x_3$

$a_{12} = x_2 + x_4$

$a_{13} = x_1 x_2$

$a_{14} = x_3 x_4$

$a_{15} = x_2 x_3$

$a_{21} = a_{13} + a_{14}$

a41

$a_{31} = a_{12} \cdot a_{32}$

$a_{32} = \overline{a_{21}}$

a31

$a_{33} = a_{21} a_{15}$

a32

$a_{51} = z_1 = x_4 + a_{11} + a_{41}$

Ispravi za a31 to je a41 a a32 je a31 a33 je a32

$$Z_1 = a_{41} = x_4 + a_{11} + a_{31}$$ a41

$$= x_4 + x_1 x_2 x_3 + a_{12}\, a_{32}$$ a31

$$= x_4 + x_1 x_2 x_3 + (x_2 + x_4)\,\overline{a_{21}}$$

$$= x_4 + x_1 x_2 x_3 + (x_2 + x_4)\,\overline{(a_{13} + a_{14})}$$

$$= x_4 + x_1 x_2 x_3 + (x_2 + x_4)\,\overline{(x_1 x_2 + x_3 x_4)}$$

$$= x_4 + x_1 x_2 x_3 + (x_2 + x_4)\,(\overline{x_1 x_2} \cdot \overline{x_3 x_4})$$

$$= x_4 + x_1 x_2 x_3 + (x_2 + x_4)\,(\bar{x}_1 + \bar{x}_2)(\bar{x}_3 + \bar{x}_4)$$

$$= x_4 + x_1 x_2 x_3 + (\bar{x}_1 x_2 + \bar{x}_1 x_4 + \bar{x}_2 x_2 + \bar{x}_2 x_4)(\bar{x}_3 + \bar{x}_4)$$

$$= x_4 + x_1 x_2 x_3 + \bar{x}_1 x_2 \bar{x}_3 + \bar{x}_1 \bar{x}_3 x_4 + \bar{x}_2 \bar{x}_3 x_4 + \bar{x}_1 x_2 \bar{x}_4 + \bar{x}_1 x_4 \bar{x}_4 + \bar{x}_2 x_4 \bar{x}_4$$

$$= x_4 + x_1 x_2 x_3 + \bar{x}_1 x_2 \bar{x}_3 + \bar{x}_1 \bar{x}_3 x_4 + \bar{x}_2 \bar{x}_3 x_4 + \bar{x}_1 x_2 \bar{x}_4$$

$$= x_4 + x_1 x_2 x_3 + \bar{x}_1 x_2 \bar{x}_3 + \bar{x}_2 \bar{x}_3 x_4 + \bar{x}_1 x_2 \bar{x}_4$$

$$= a_{15} a_{21} = (x_2 + x_3)(a_{13} + a_{14})$$

$$Z_2 = a_{33} = a_{15} a_{21} = (x_2 + x_3)(a_{13} + a_{14})$$

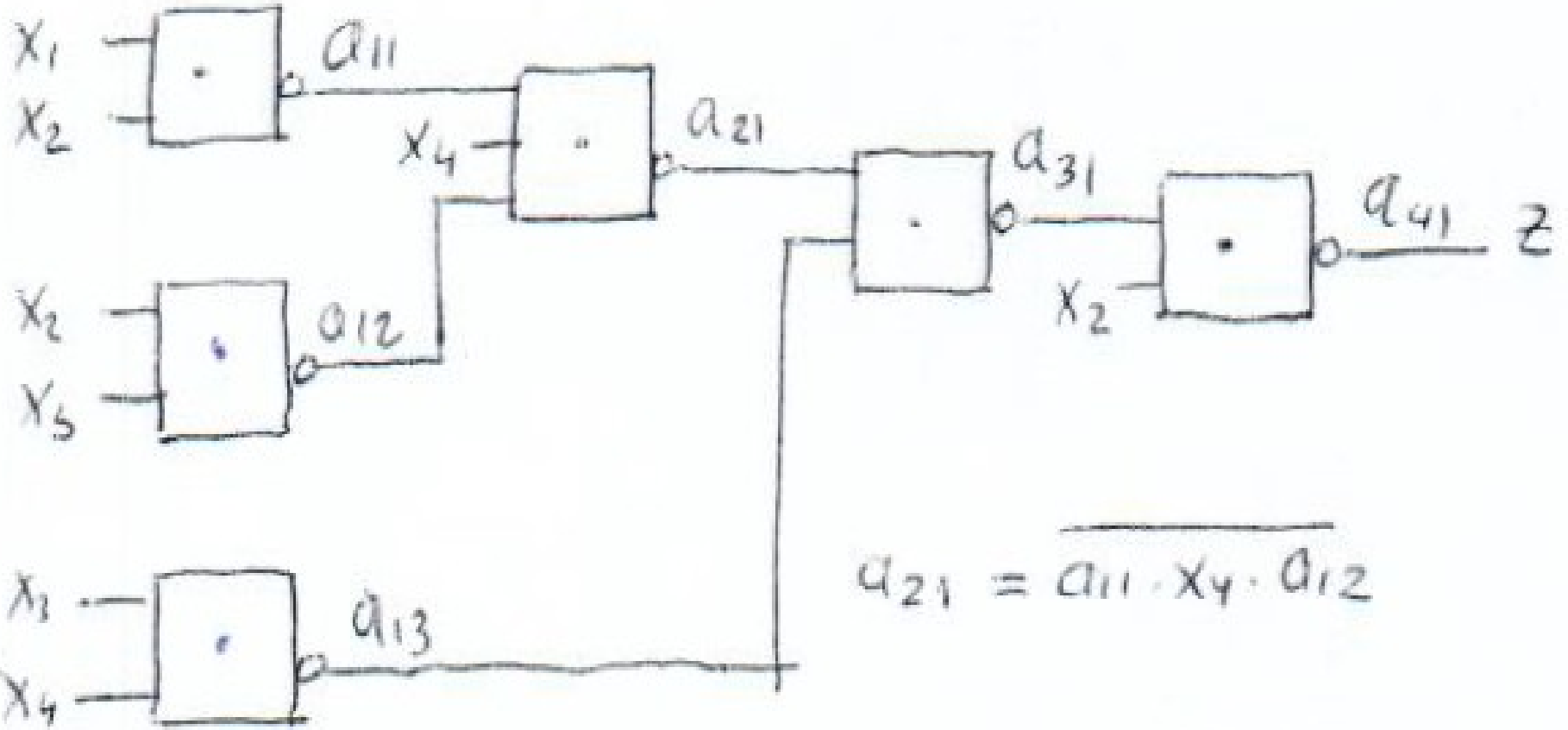
a32

$$= (x_2 + x_3)(x_1 x_2 + x_3 x_4)$$

$$= x_1 x_2 x_2 + x_2 x_3 x_4 + x_1 x_2 x_3 + x_3 x_3 x_4$$

$$= x_1 x_2 + x_2 x_3 x_4 + x_1 x_2 x_3 + x_3 x_4$$

$$= x_1 x_2 + x_3 x_4$$



$$a_{21} = \overline{a_{11} \cdot x_4 \cdot a_{12}}$$

$$a_{11} = \overline{x_1 x_2}$$

$$a_{12} = \overline{x_2 x_3}$$

$$a_{13} = \overline{x_3 x_4}$$

$$a_{31} = \overline{a_{21} \cdot a_{13}}$$

$$a_{41} = z = \overline{a_{31} x_2}$$

$$Z = a_{41} = \overline{a_{31} x_2} = \overline{\overline{a_{21} \cdot a_{13}} \cdot x_2}$$

$$= \overline{(\bar{a}_{21} + \bar{a}_{13}) x_2} = \overline{\bar{a}_{21} + \bar{a}_{13}} + \bar{x}_2 = a_{21} \cdot a_{13} + \bar{x}_2$$

$$= \overline{\overline{a_{21} \cdot a_{13}}} + \bar{x}_2$$

$$= a_{21} \cdot a_{13} + \bar{x}_2$$

$$= \overline{a_{11} x_4 a_{12}} \cdot \overline{x_3 x_4} + \bar{x}_2$$

$$= \overline{\overline{X_1 X_2} \cdot X_4 \cdot \overline{X_2 X_3} \cdot \overline{X_3 X_4}} + \bar{X}_2$$

$$= \left(\overline{\overline{X_1 X_2}} + \bar{X}_4 + \overline{\overline{X_2 X_3}}\right) \overline{X_3 X_4} + \bar{X}_2$$

$$= \left(X_1 X_2 + \bar{X}_4 + X_2 X_3\right)\left(\bar{X}_3 + \bar{X}_4\right) + \bar{X}_2$$

$$= X_1 X_2 \bar{X}_3 + \bar{X}_3 \bar{X}_4 + X_2 X_3 \bar{X}_3 + X_1 X_2 \bar{X}_4 + \bar{X}_4 + X_2 X_3 \bar{X}_4 + \bar{X}_2$$

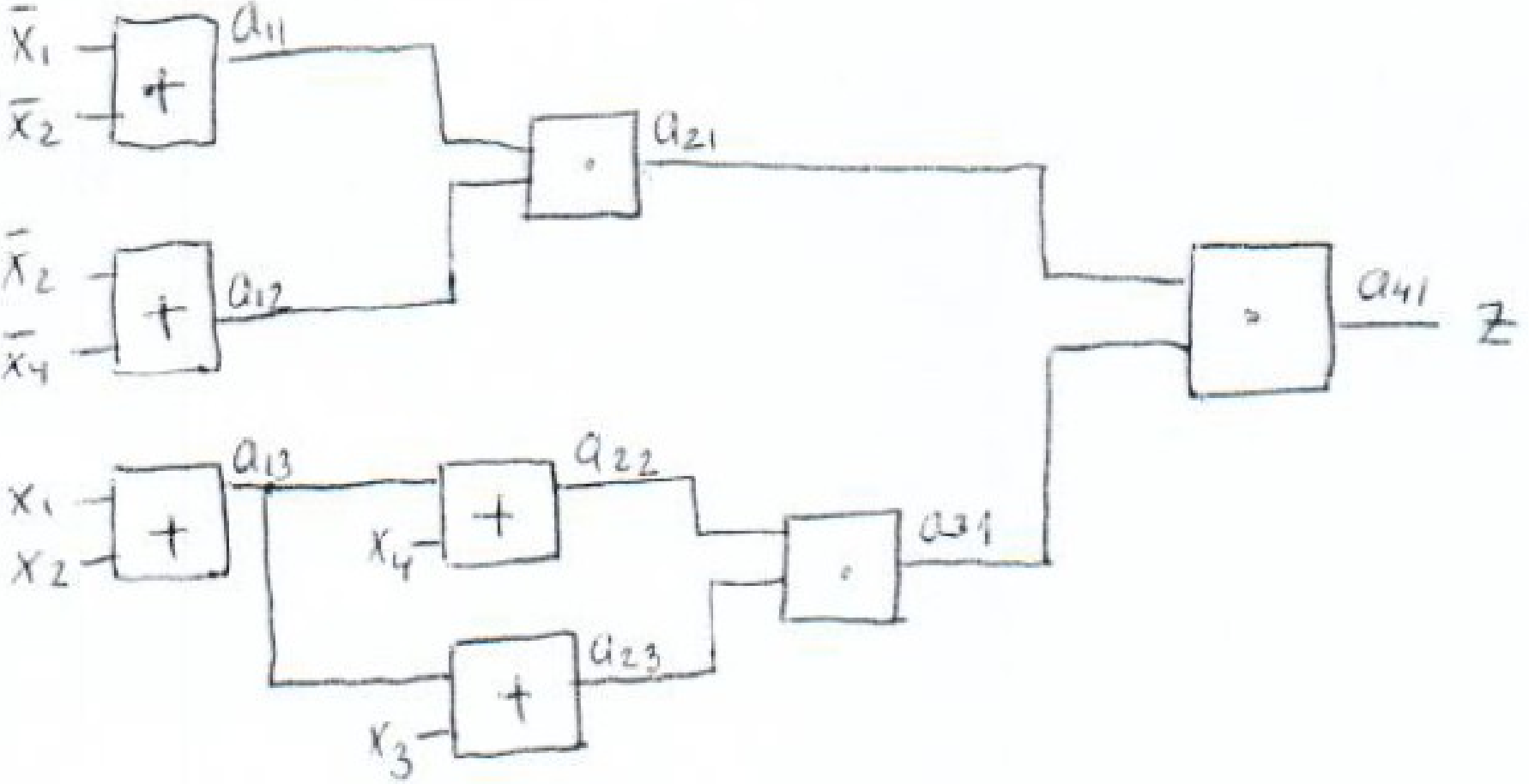
$$= X_1 X_2 \bar{X}_3 + \bar{X}_3 \bar{X}_4 + X_1 X_2 \bar{X}_4 + \bar{X}_4 + X_2 X_3 \bar{X}_4 + \bar{X}_2$$

$$= x_1 x_2 \bar{x}_3 + \bar{x}_4 (\bar{x}_3 + x_1 x_2 + 1 + x_2 x_3) + \bar{x}_2 = x_1 x_2 \bar{x}_3 + \bar{x}_4 + \bar{x}_2$$

$$= (x_1 \bar{x}_3 + \bar{x}_2)(x_2 + \bar{x}_2)^1 + \bar{x}_4$$

?

$$= x_1 \bar{x}_3 + \bar{x}_2 + \bar{x}_4$$



$$Z = a_{41} = a_{21} \cdot a_{31} = a_{11} \cdot a_{12} \cdot a_{22} \cdot a_{23}$$

$$= (\bar{x}_1 + \bar{x}_2)(\bar{x}_2 + \bar{x}_4)(a_{13} + x_4)(a_{13} + x_3)$$

$$= (\bar{x}_1 + \bar{x}_2)(\bar{x}_2 + \bar{x}_4)(x_1 + x_2 + x_4)(x_1 + x_2 + x_3)$$

Ovo ako stignes ili na predavanjima da nastavis sintezu

Користећи Карноове таблице наћи бар једну минималну ДНФ прекидачке ф-је задате скуповима индекса:

$f(0) = \{0,1,2,3,6,7,8,13,17,22,23,27,28,29\}$ и

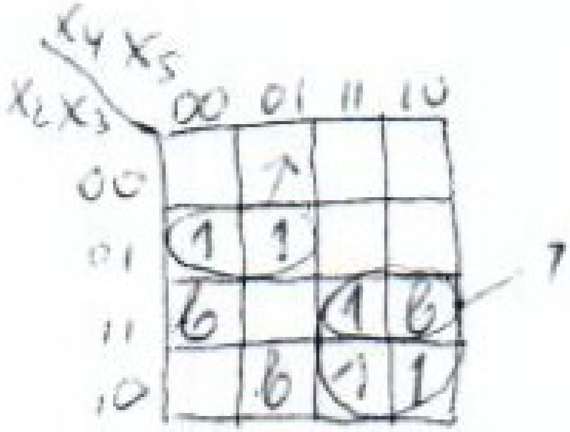
$f(b) = \{9,12,14,16,19,21,25\}$ (1)

Реализовати добијену ДНФ помоћу:

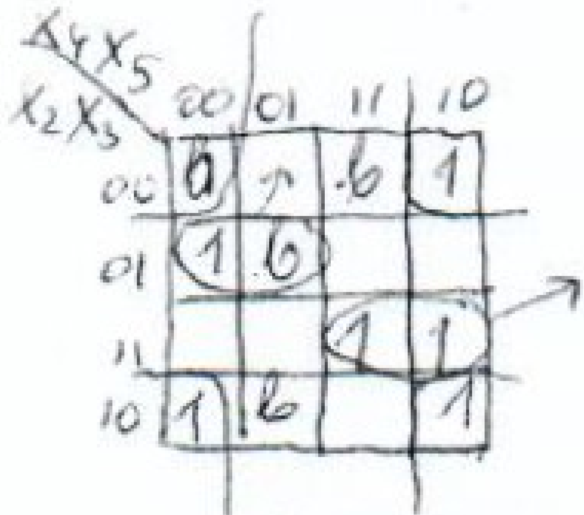
а) NILI елемената без ограничења броја улаза

б) NI — " — " — " — " — "

$f(1) = \{4,5,10,11,15,18,20,24,26,30,31\}$; $f(b) = \{9,12,14,16,19,21,25\}$



$x_1 = 0$



$x_1 = 1$

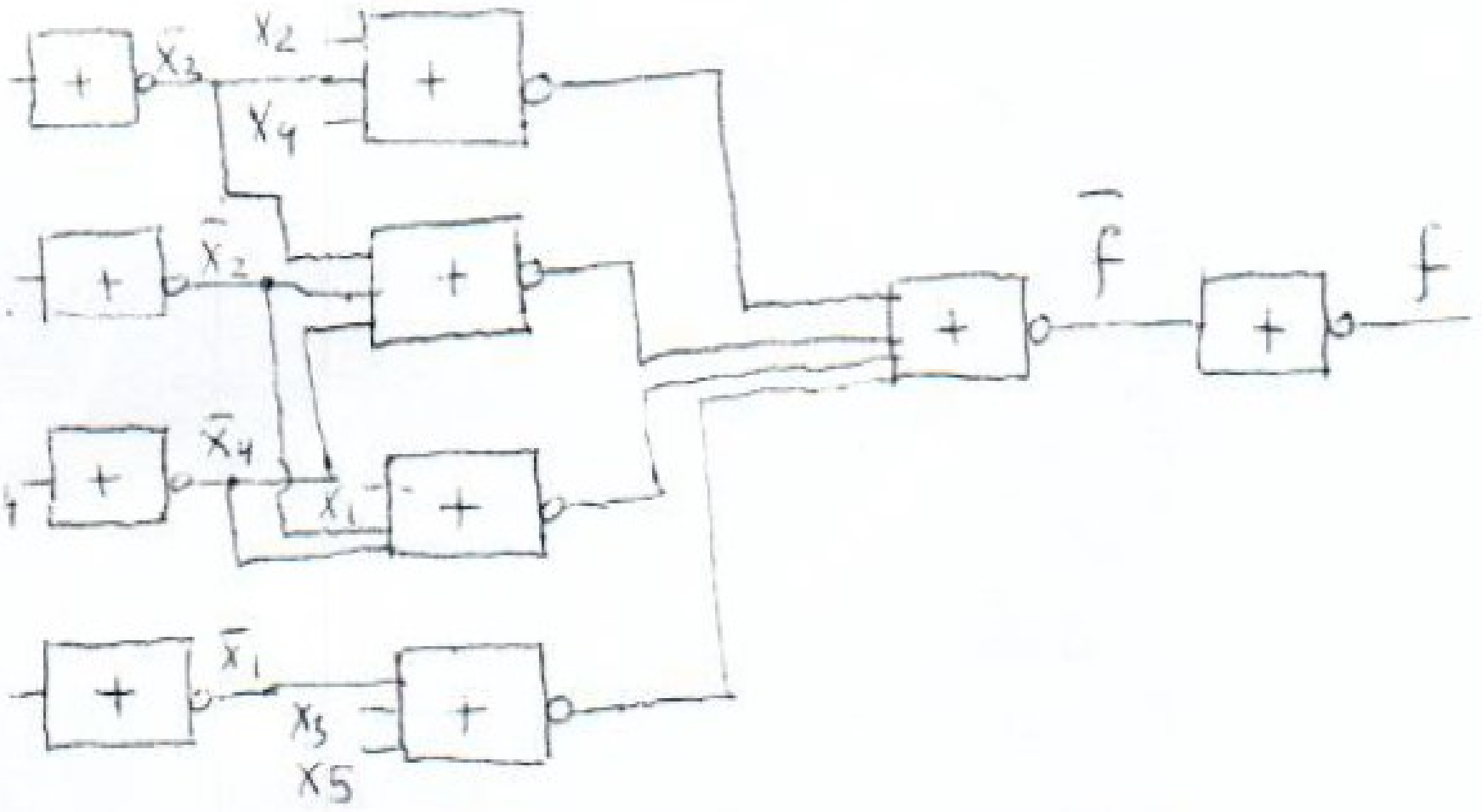
$$f = \bar{x}_2 x_3 \bar{x}_4 + x_2 x_3 x_4 + \bar{x}_1 x_2 x_4 + x_1 \bar{x}_3 \bar{x}_5$$

$$\bar{f} = \overline{\bar{x}_2 x_3 \bar{x}_4 + x_2 x_3 x_4 + \bar{x}_1 x_2 x_4 + x_1 \bar{x}_3 \bar{x}_5}$$

$$= \overline{\bar{x}_2 x_3 \bar{x}_4} \cdot \overline{x_2 x_3 x_4} \cdot \overline{\bar{x}_1 x_2 x_4} \cdot \overline{x_1 \bar{x}_3 \bar{x}_5}$$

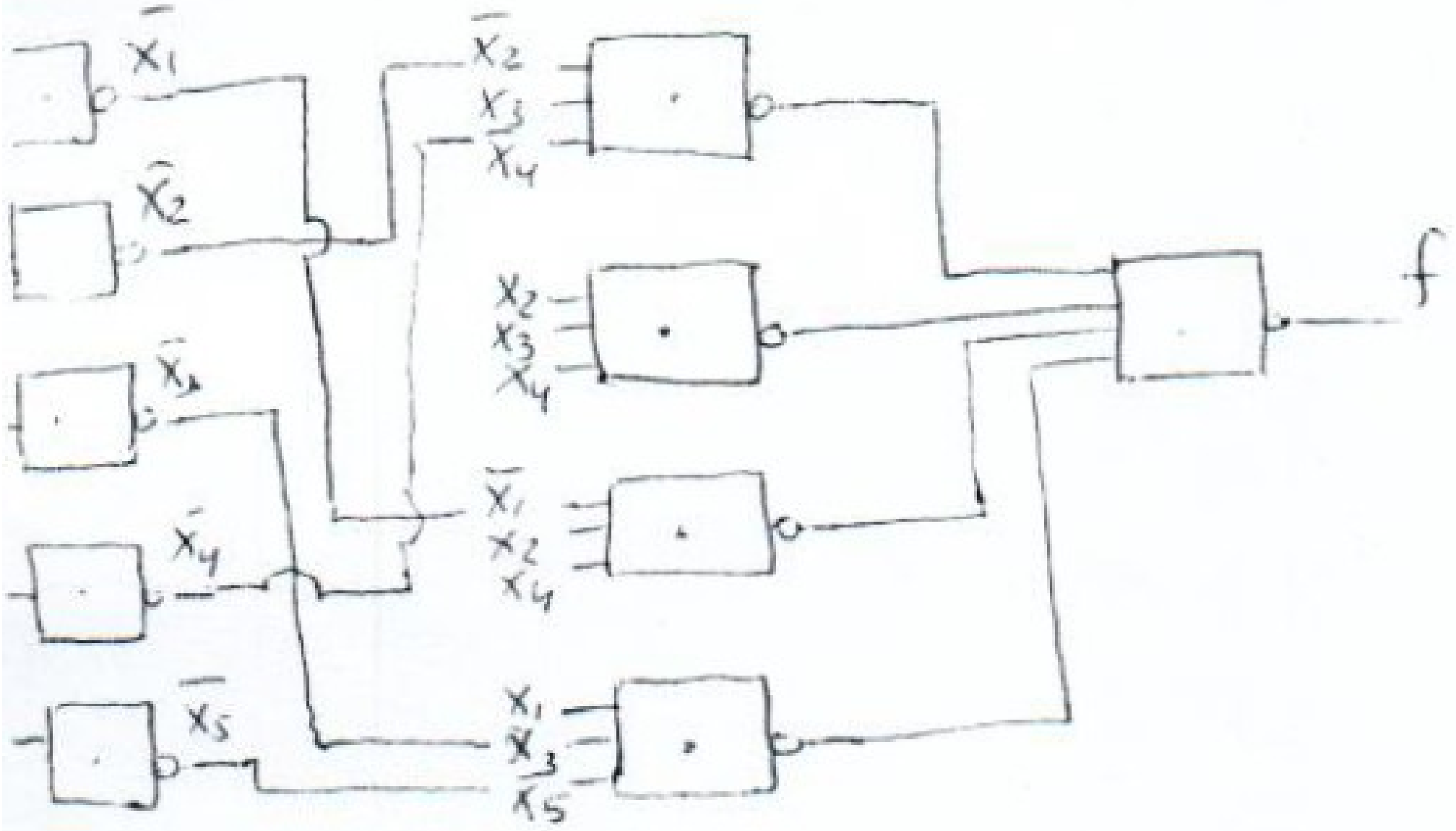
$$= \overline{(x_2 + \bar{x}_3 + x_4)(\bar{x}_2 + \bar{x}_3 + \bar{x}_4)(x_1 + \bar{x}_2 + \bar{x}_4)(\bar{x}_1 + x_3 + x_5)}$$

$$= \overline{x_2 + \bar{x}_3 + x_4} + \overline{\bar{x}_2 + \bar{x}_3 + \bar{x}_4} + \overline{x_1 + \bar{x}_2 + \bar{x}_4} + \overline{\bar{x}_1 + x_3 + x_5}$$


$\bar{x}_3$
x_2
x_4
$\bar{x}_2$
$\bar{x}_4$
$\bar{x}_1$
$\bar{x}_1$
x_5
$x5$
$\bar{f}$
f

$$f = \overline{\overline{X}_2 X_3 \overline{X}_4 + X_2 X_3 X_4 + \overline{X}_1 X_2 X_4 + X_1 \overline{X}_3 \overline{X}_5}$$

$$= \overline{\overline{X}_2 X_3 \overline{X}_4} \cdot \overline{X_2 X_3 X_4} \cdot \overline{\overline{X}_1 X_2 X_4} \cdot X_1 \overline{X}_3 \overline{X}_5$$


$\bar{x}_1$
$\bar{x}_2$
$\bar{x}_3$
$\bar{x}_4$
$\bar{x}_2$
x_2
x_3
$\bar{x}_4$
$\bar{x}_3$
$\bar{x}_1$
x_2
$\bar{x}_4$
$\bar{x}_4$
$\bar{x}_5$
x_1
$\bar{x}_3$
$\bar{x}_5$
f

② Користећи Карноове таблице наћи бар једну минималну КНФ прекидачке ф-је задате скуповима индекса:

$$f(1) = \{4, 5, 10, 11, 15, 20, 26, 30, 31\}$$ и

$$f(b) = \{9, 12, 14, 16, 19, 21, 25\}$$

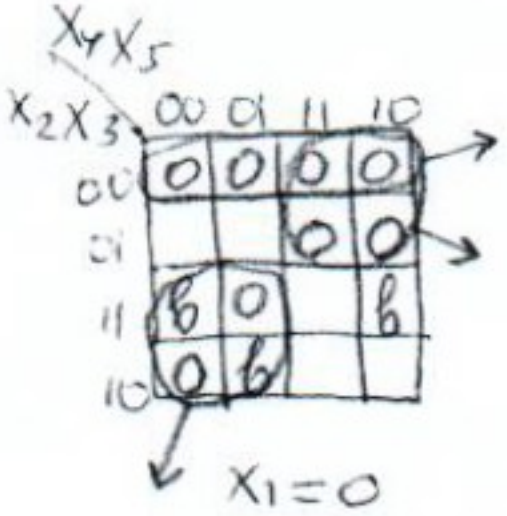
. Реализовати добијену КНФ помоћу:

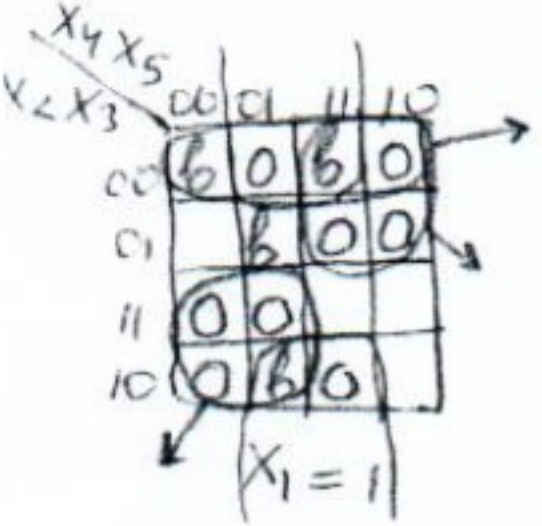
а) NILI елемената без ограничења ф-ја улаза

б) NI елемената — || — — || —

Претпоставља се да на улазе стижу и сигнали који представљају негације независно променљивих.

a) $f(o) = \{ 0,1,2,\overset{3}{\downarrow},6,7,8,13,17,18,22,23,24,27,28,29 \}$

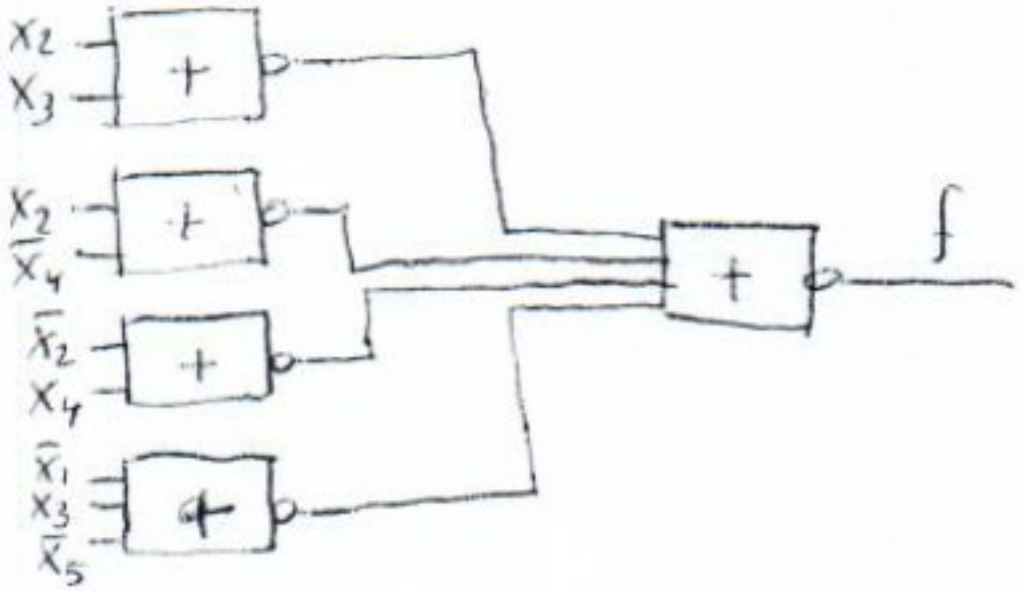




$$f_{MINKNF} = (x_2 + x_3)(x_2 + \bar{x}_4)(\bar{x}_2 + x_4)(\bar{x}_1 + x_3 + \bar{x}_5)$$

$$f = \overline{(x_2 + x_3)(x_2 + \bar{x}_4)(\bar{x}_2 + x_4)(\bar{x}_1 + x_3 + \bar{x}_5)}$$

$$= \overline{x_2 + x_3} + \overline{x_2 + \bar{x}_4} + \overline{\bar{x}_2 + x_4} + \overline{\bar{x}_1 + x_3 + \bar{x}_5}$$

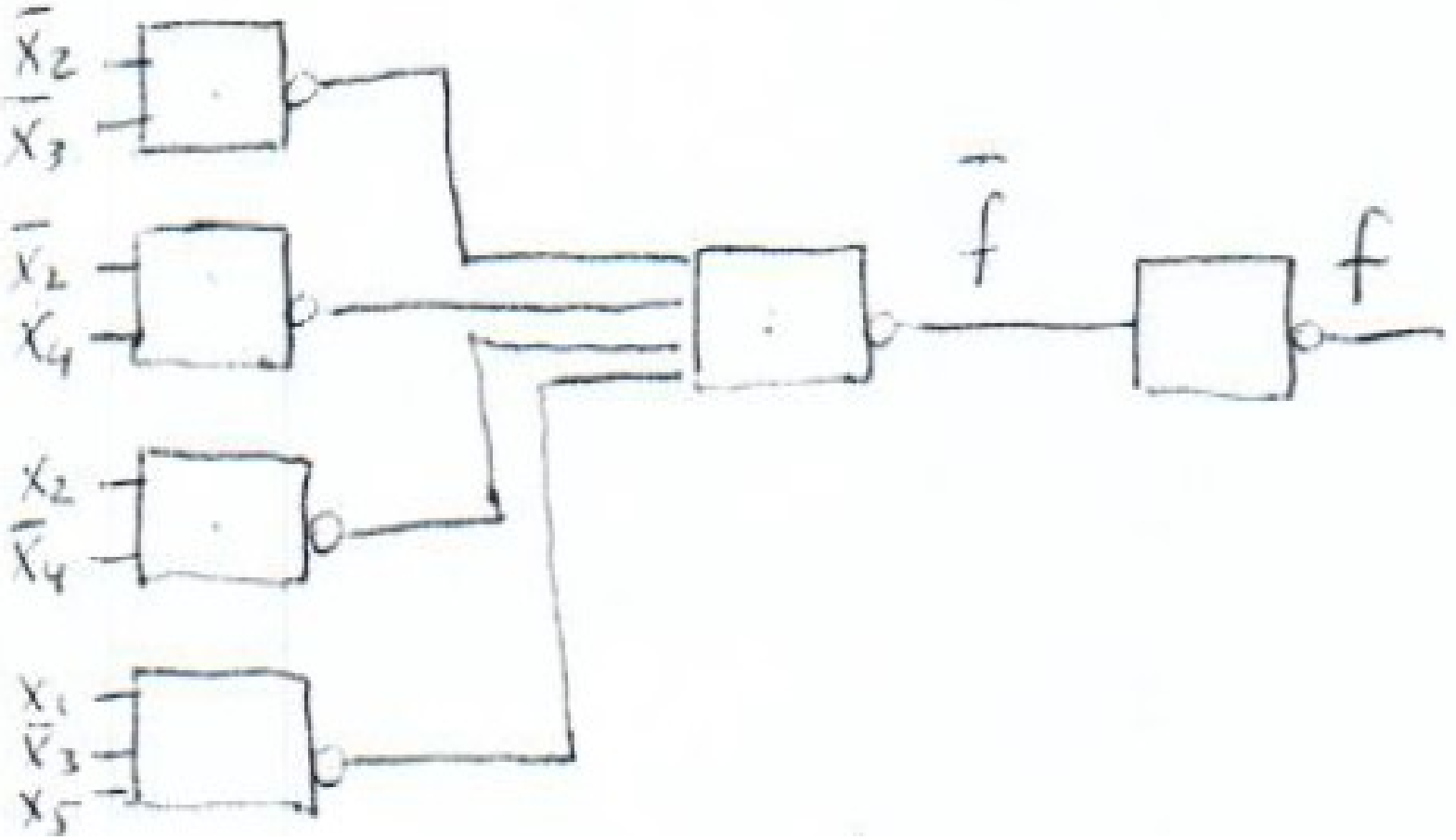


$$\overline{f} = \overline{(x_2 + x_3)(x_2 + \bar{x}_4)(\bar{x}_2 + x_4)(\bar{x}_1 + x_3 + \bar{x}_5)}$$

$$= \overline{x_2 + x_3} + \overline{x_2 + \bar{x}_4} + \overline{\bar{x}_2 + x_4} + \overline{\bar{x}_1 + \bar{x}_3 + \bar{x}_5}$$

$$= \bar{x}_2 \bar{x}_3 + \bar{x}_2 \cdot x_4 + x_2 \cdot \bar{x}_4 + x_1 \cdot \bar{x}_3 \cdot x_5$$

$$= \overline{\bar{x}_2 \bar{x}_3} \cdot \overline{\bar{x}_2 \cdot x_4} \cdot \overline{x_2 \bar{x}_4} \cdot \overline{x_1 \bar{x}_3 x_5}$$


$\bar{x}_2$
$\bar{x}_3$
$\bar{x}_2$
x_4
x_2
$\bar{x}_4$
x_1
$\bar{x}_3$
x_5
$\bar{f}$
f