

Задание № 1.

a)

The diagram shows a 4x8 grid representing a 4x4 matrix. The rows are labeled x_1 , x_2 , x_3 , and x_4 on the left. The columns are labeled x_5 and x_5 at the bottom. The grid contains 1s and *s in the following cells (row, column):

- Row x_1 : (1, 2), (1, 4), (1, 6), (1, 8)
- Row x_2 : (2, 1), (2, 3), (2, 5), (2, 7)
- Row x_3 : (3, 1), (3, 3), (3, 5), (3, 7)
- Row x_4 : (4, 1), (4, 3), (4, 5), (4, 7)

Some cells are highlighted with boxes: (1, 2), (1, 4), (1, 6), (2, 1), (2, 3), (2, 5), (2, 7), (3, 1), (3, 3), (3, 5), (3, 7), (4, 1), (4, 3), (4, 5), (4, 7).

$$f = \overline{x_1}x_2\overline{x_3}x_4 + x_1\overline{x_2}x_4 + x_1x_2\overline{x_4}x_5 + x_1x_2x_3\overline{x_5} + x_1\overline{x_2}x_3x_5$$

6)

A 4x6 grid representing a 2D array. The grid is annotated with various elements:

- Row Labels:**
 - Row 1: x_2 (above the first two columns)
 - Row 3: x_3 (above the last three columns)
 - Row 4: x_5 (below the first three columns) and x_5 (below the last three columns)
- Column Labels:**
 - Column 1: x_1 (to the left of the first row)
 - Column 6: x_4 (to the right of the last row)
- Grid Content:**
 - Row 1: [1] [1] [] [] [] []
 - Row 2: [] [1] [] [] [] []
 - Row 3: [] [] [] [1] [] [1]
 - Row 4: [] [] [1] [1] [1] []
- Annotations:**
 - Red boxes around the '1' in Row 1, Column 1; Row 1, Column 2; Row 1, Column 6; Row 2, Column 2; Row 3, Column 4; Row 3, Column 6; Row 4, Column 3; Row 4, Column 4; Row 4, Column 5.
 - Red asterisks in Row 1, Column 3; Row 1, Column 4; Row 2, Column 6; Row 4, Column 6.

$$f = \overline{x_1}x_3\overline{x_4} + \overline{x_1}x_2x_4\overline{x_5} + x_1x_2\overline{x_3}x_5 + x_1\overline{x_4}x_5$$

Задание № 2.

б)

		x_2									
x_1		1	*	1	0	0	0	1	0		x_4
		*	1	*	*	1	0	*	1		
		*	0	0	1	1	0	*	1		
		*	1	1	*	0	*	*	0		
		x_3									
		x_5				x_5					

$$f_{\text{днф}} = x_4 \overline{x_5} + \overline{x_1} x_2 \overline{x_4} + x_2 \overline{x_3} x_5 + x_1 x_2 x_5 + \overline{x_2} \overline{x_3} x_5$$

		x_2									
x_1		1	*	1	0	0	0	1	0		x_4
		*	1	*	*	1	0	*	1		
		*	0	0	1	1	0	*	1		
		*	1	1	*	0	*	*	0		
		x_3									
		x_5				x_5					

$$f_{\text{кнф}} = x_3 \overline{x_4} x_5 + \overline{x_2} x_4 x_5 + \overline{x_2} x_3 x_5 + \overline{x_1} x_2 x_4 x_5$$

в)

		x_2									
x_1		1	*	1	*	1	1	*	*		x_4
		1	0	*	*	*	0	*	1		
		1	1	1	*	*	0	*	1		
		*	0	*	*	0	*	*	0		
		x_3									
		x_5				x_5					

$$f_{\text{днф}} = x_1 \overline{x_4} + x_4 \overline{x_5} + \overline{x_1} x_2 x_4 x_5$$

$$\begin{array}{c}
 \overline{x_2} \\
 \left. x_1 \right| \begin{array}{|c|c|c|c|c|c|c|c|} \hline 1 & * & 1 & * & 1 & 1 & * & * \\ \hline 1 & \boxed{0} & \boxed{*} & * & * & \boxed{0} & \boxed{*} & 1 \\ \hline 1 & 1 & 1 & * & * & \boxed{0} & \boxed{*} & 1 \\ \hline \boxed{*} & \boxed{0} & * & * & \boxed{0} & * & * & \boxed{0} \\ \hline \end{array} \left. x_4 \right| \\
 \overline{x_3} \\
 \overline{x_5} \qquad \overline{x_5}
 \end{array}$$

$$f_{\text{KH}\Phi} = \overline{x_1x_4} + x_1x_2x_4x_5 + \overline{x_2}x_4x_5$$