אלקטרוניקה מחשבים א׳ 815101 תשע"ג

הצעת פתרון

נערך ע"י: יוסי גולנג'ינר

שאלה 1

א.

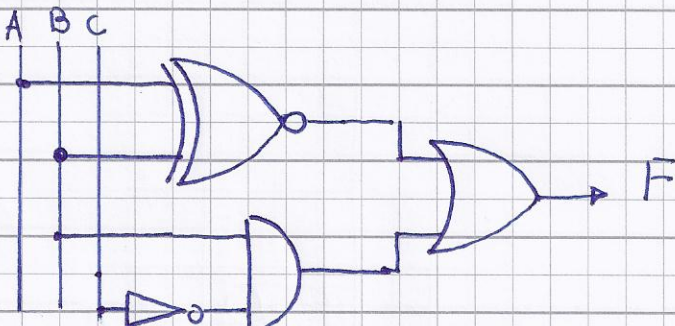
$$F=\overline{\overline{A\cdot "1"}\oplus B\cdot\overline{(B+C)\cdot\overline{(C+"0")}}}$$

ב.

$$F=\overline{\overline{\bar{A}\oplus B}\cdot\overline{(B+C)\cdot\bar{C}}}=\bar{A}\oplus B+B\bar{C}+\underbrace{C\cdot\bar{C}}_{0}$$

$$=\bar{A}\bar{B}+AB+B\bar{C}=\overline{A\oplus B}+B\bar{C}$$

ג.



שאלה 2

א.

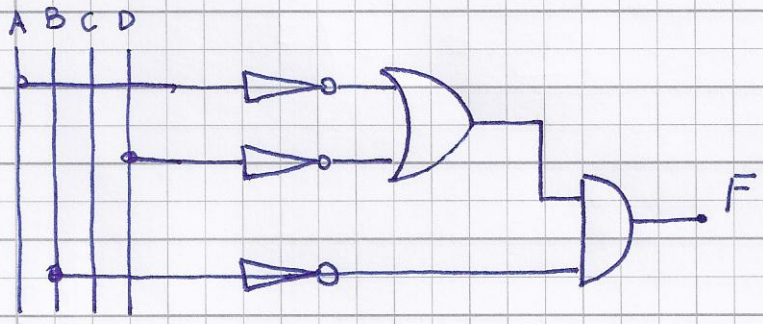
CD \ AB	00	01	11	10
00	1 (0)	(4)	(12)	1 (8)
01	1 (1)	(5)	(13)	(9)
11	1 (3)	Ø (7)	Ø (15)	Ø (11)
10	1 (2)	(6)	(14)	1 (10)

ב.

$$F=\bar{A}\bar{B}+\bar{B}\bar{D}$$

שאלה 2 סעיף ב

$$F = \bar{A}\bar{B} + \bar{B}\bar{D} = \bar{B}(\bar{A} + \bar{D})$$



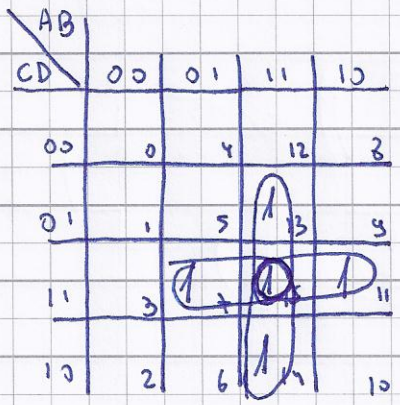
שאלה 3

סעיף א

מספר	A	B	C	D	F
0	0	0	0	0	0
1	0	0	0	1	0
2	0	0	1	0	0
3	0	0	1	1	0
4	0	1	0	0	0
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	1
8	1	0	0	0	0
9	1	0	0	1	0
10	1	0	1	0	0
11	1	0	1	1	1
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	1
15	1	1	1	1	1

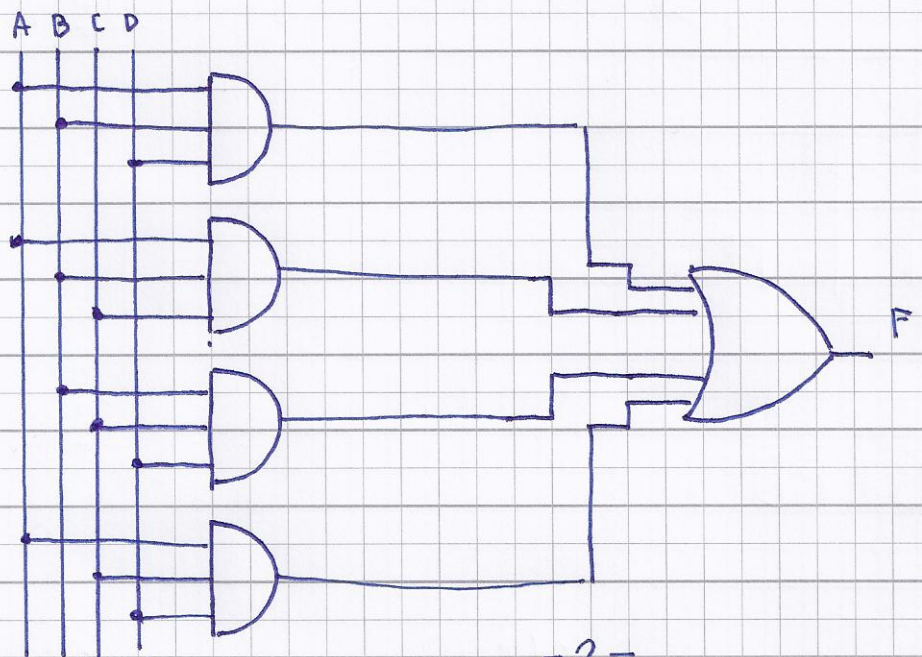
$$F = \Sigma(7, 11, 13, 14, 15)$$

סעיף ב



$$F = A\bar{B}D + A\bar{B}C + B\bar{C}D + A\bar{C}D$$

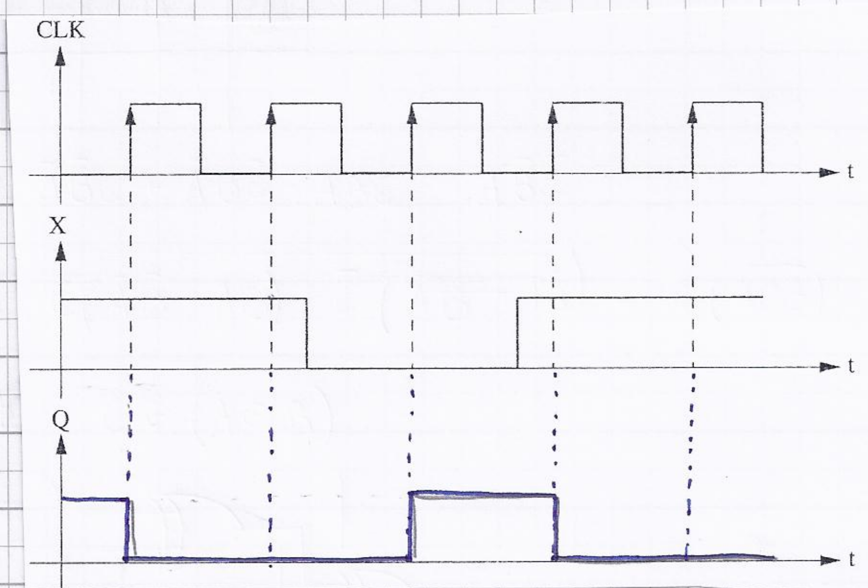
סעיף ג



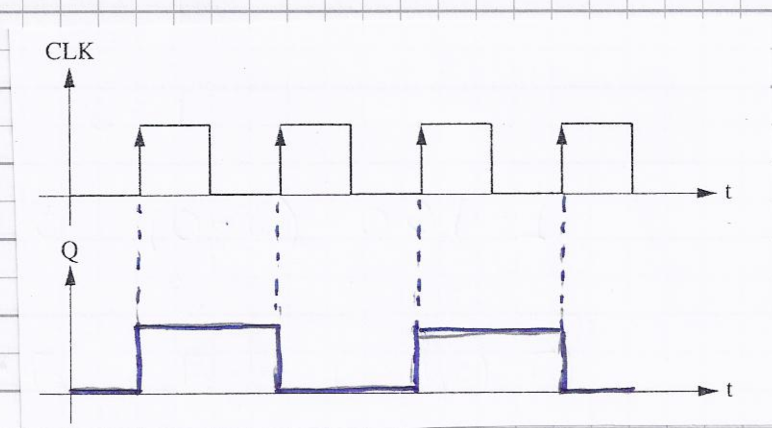
שאלה 4

א.

$X \oplus 1$ → $X=0$: $0 \oplus 1 = 0$
→ $X=1$: $1 \oplus 1 = 0$



ב.



ג.

המערכת מכפילה את זמן המחזור של אות השעון פי 2, כלומר מחלקת את תדר אות השעון ל 2.

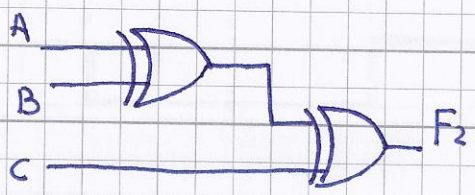
F_2

AB \ C	00	01	11	10
0		(1)		(1)
1	(1)		(1)	

$$F_2 = \bar{A}\bar{B}C + \bar{A}B\bar{C} + ABC + A\bar{B}\bar{C}$$

$$F_2 = C(\bar{A}\bar{B} + AB) + \bar{C}(\bar{A}B + A\bar{B}) = C\overline{(A \oplus B)} + \bar{C}(A \oplus B)$$

$$F_2 = C \oplus (A \oplus B)$$



שאלה 5

.א

.ב

$A = B$, $C =$ "1"

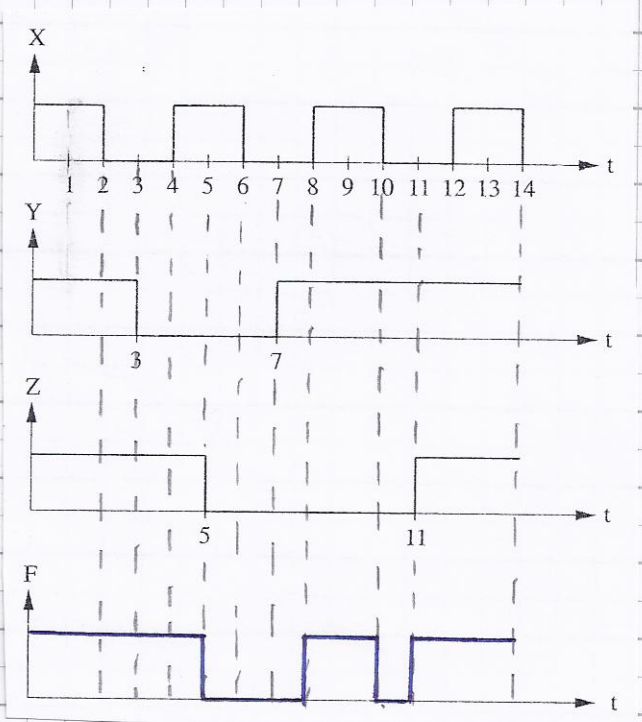
$(A \oplus B) = 0$ $\quad 0 \oplus C = 0 \oplus 1 = 1$

.ג

$F = F_1 \cdot F_2$, $F_2 = 1$ (נתון)

$F = F_1 \cdot 1 \rightarrow F = F_1 = XY + Z$

שורה	X	Y	Z	F
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	1
4	1	0	0	0
5	1	0	1	1
6	1	1	0	1
7	1	1	1	1



א.

$$F_1 = X + \bar{X}y + (\overline{X+y}) \cdot z$$

$$F_1 = X + \cancel{\bar{X}} \cdot y + \cancel{\bar{X}} \cdot \bar{y} \cdot z = X + y + \cancel{\bar{y}} \cdot z$$

$$F_1 = X + y + z$$

ב.

$$F_2 = X\bar{w} + \bar{X}\bar{y} + \bar{z}w + \bar{X}\bar{z} + \bar{y}w$$

$$F_2 = X\bar{w} + \bar{X}\bar{y}(w+\bar{w}) + \bar{z}w(x+\bar{x}) + \bar{X}\bar{z}(w+\bar{w}) + \bar{y}w(x+\bar{x})$$

$$= X\bar{w} + \bar{X}\bar{y}w + \bar{X}\bar{y}\bar{w} + \bar{z}xw + \bar{X}\bar{z}w + X\bar{z}w + \bar{X}\bar{z}\bar{w} + x\bar{y}w + \bar{X}\bar{y}w$$

$$= X\bar{w} + \bar{y}(\bar{X}w + \bar{X}\bar{w} + Xw + \bar{X}w) + \bar{z}(xw + \bar{X}w + \bar{X}w + \bar{X}\bar{w})$$

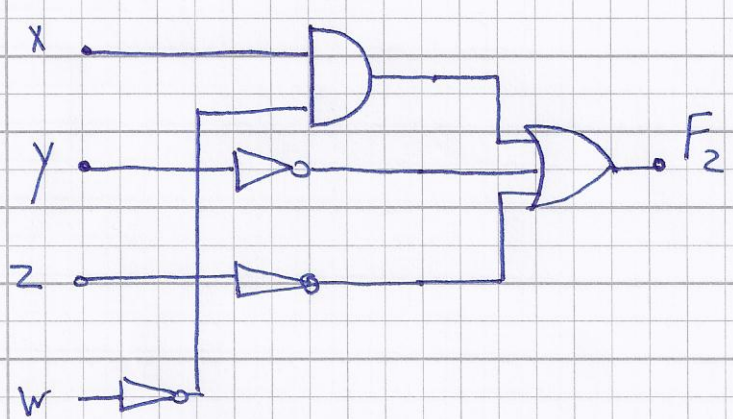
$$= X\bar{w} + \bar{y}(\bar{X} + w) + \bar{z}(\bar{X} + w)$$

$$= X\bar{w} + (\bar{X} + w)(\bar{y} + \bar{z})$$

$$= X\bar{w} + \cancel{\overline{X\bar{w}}}(\bar{y} + \bar{z})$$

$$F_2 = X\bar{w} + \bar{y} + \bar{z}$$

ג.



שאלה 7

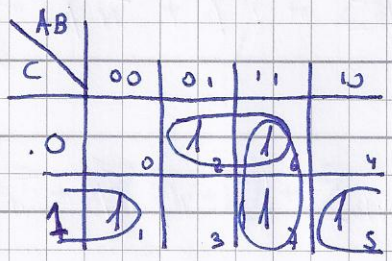
א.

מס'	A	B	C	F
0	0	0	0	0
1	0	0	1	1
2	0	1	0	1
3	0	1	1	0
4	1	0	0	0
5	1	0	1	1
6	1	1	0	1
7	1	1	1	1

ב. ה. הפונקציה

$$F = \Sigma(1, 2, 5, 6, 7)$$

ג.



$$F = B\bar{C} + AB + \bar{B}C = AB + B \oplus C$$

ד.