5

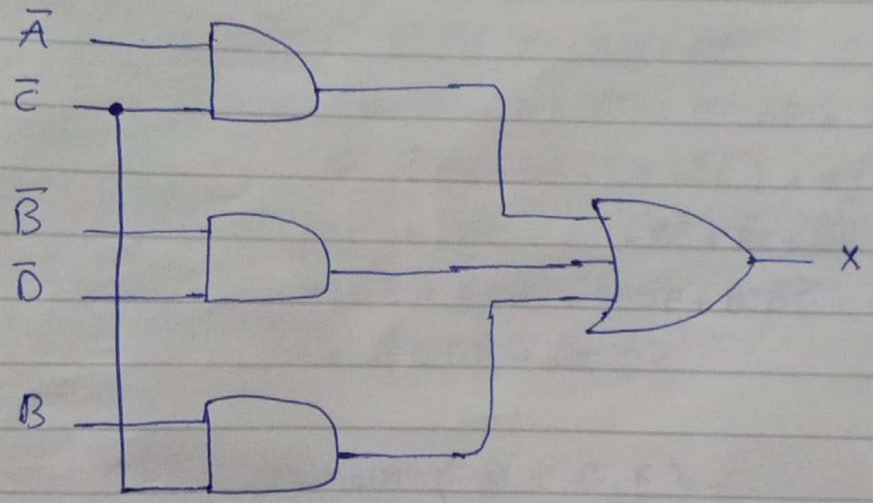
(1)

$$\overline{(C+D)(\bar{B}+C)} + \overline{(B+D)(A+B+C)} = X$$

$$X = \overline{(C+D)} + \overline{(\bar{B}+C)} + \overline{(B+D)} + \overline{(A+B+C)}$$

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

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



(2)

a- $ACD + AC + CD = AC + CD$

b- $BC + B\bar{C}DE + DE = BC + DE$

c- $B + BCD + CE + C\bar{D}E = CE + B$

(3)

a- domain (A, C, D)

$$SSOP = AC + CD$$
$$= AC(D+\bar{D}) + CD(A+\bar{A})$$
$$= ACD + AC\bar{D} + ACD + \bar{A}CD$$
$$= ACD + AC\bar{D} + \bar{A}CD$$

b- domain (B, C, D, E)

$$SSOP = BC + B\bar{C}DE + DE$$
$$= BC(D+\bar{D})(E+\bar{E}) + B\bar{C}DE + DE(B+\bar{B})(C+\bar{C})$$
$$= BC(DE + D\bar{E} + \bar{D}E + \bar{D}\bar{E}) + B\bar{C}DE + DE(BC + B\bar{C} + \bar{B}C + \bar{B}\bar{C})$$
$$= BCDE + BCD\bar{E} + BC\bar{D}E + BC\bar{D}\bar{E} + B\bar{C}DE + \bar{B}CDE + \bar{B}\bar{C}DE$$

c- domain (B, C, D, E)

$$SSOP = B + BCD + CE + C\bar{D}E$$
$$= B(C+\bar{C})(D+\bar{D})(E+\bar{E}) + BCD(E+\bar{E}) + CE(B+\bar{B})(D+\bar{D}) + C\bar{D}E(B+\bar{B})$$
$$= BCDE + BCD\bar{E} + BC\bar{D}E + BC\bar{D}\bar{E} + B\bar{C}DE + B\bar{C}D\bar{E} + B\bar{C}\bar{D}E + B\bar{C}\bar{D}\bar{E} + \bar{B}C\bar{D}E + \bar{B}CDE$$

④

a- $\overset{m_7}{111} + \overset{m_6}{110} + \overset{m_3}{011}$

b- $\overset{m_{15}}{1111} + \overset{m_{14}}{1110} + \overset{m_{13}}{1101} + \overset{m_{12}}{1100} + \overset{m_{11}}{1011} + \overset{m_7}{0111} + \overset{m_3}{0011}$

c- $\overset{m_{15}}{1111} + \overset{m_{14}}{1110} + \overset{m_{13}}{1101} + \overset{m_{12}}{1100} + \overset{m_{11}}{1011} + \overset{m_{10}}{1010} + \overset{m_9}{1001} + \overset{m_8}{1000}$

$+ \overset{m_5}{0101} + \overset{m_7}{0111}$

⑤

a- $0 + 1 + 2 + 4 + 5$

$000 * 001 * 010 * 100 * 101$

$M_0 \quad M_1 \quad M_2 \quad M_4 \quad M_5$

$= (A+C+D)(A+C+D')(A+C'+D)(A'+C+D)(A'+C+D')$

b- $M_0 \; M_1 \; M_2 \; M_4 \; \overset{M_6}{\downarrow} M_5 \; M_8 \; M_9 \; M_{10}$

$= (B+C+D+E)(B+C+D+\bar{E})(B+C+\bar{D}+E)(B+\bar{C}+D+E)$

$(B+\bar{C}+D+\bar{E})(B+\bar{C}+\bar{D}+E)(\bar{B}+C+D+E)$

$(\bar{B}+C+D+\bar{E})(\bar{B}+C+\bar{D}+E)$

c- $M_0 \; M_1 \; M_2 \; M_3 \; M_4 \; M_6$

$= (B+C+D+E)+(B+C+D+\bar{E})(B+C+\bar{D}+E)(B+\bar{C}+D+E)$

$(B+\bar{C}+D+\bar{E})(B+\bar{C}+\bar{D}+E)$

(6)

a- $ABC + \bar{A}\bar{B}C + AB\bar{C}$

$111 + 001 + 110$

A	B	C	X
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	1	0
1	1	0	1
1	1	1	1

(7)

a- $(A+\bar{B}+C+\bar{D})(\bar{A}+B+\bar{C}+D)(A+B+\bar{C}+\bar{D})(\bar{A}+\bar{B}+C+D)$

$0101 \quad 0100 \quad 0011 \quad 1100$

A	B	C	D		X
0	0	0	0		1
0	0	0	1		1
0	0	1	0		1
0	0	1	1	↔	0
0	1	0	0	↔	0
0	1	0	1	↔	0
0	1	1	0		1
0	1	1	1		1
1	0	0	0		1
1	0	0	1		1
1	0	1	0		1
1	0	1	1		1
1	1	0	0		1
1	1	0	1	↔	0
1	1	1	0		1
1	1	1	1		1

(10)

a-

$$SSOP = m_5 + m_6 + m_7$$

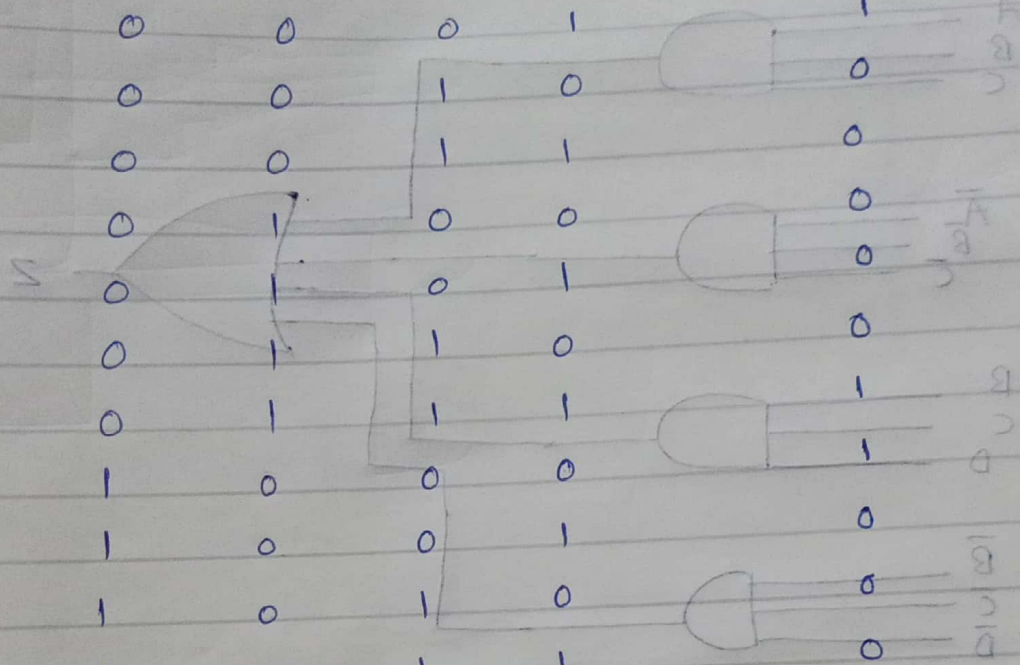
$$= A\bar{B}C + AB\bar{C} + ABC$$

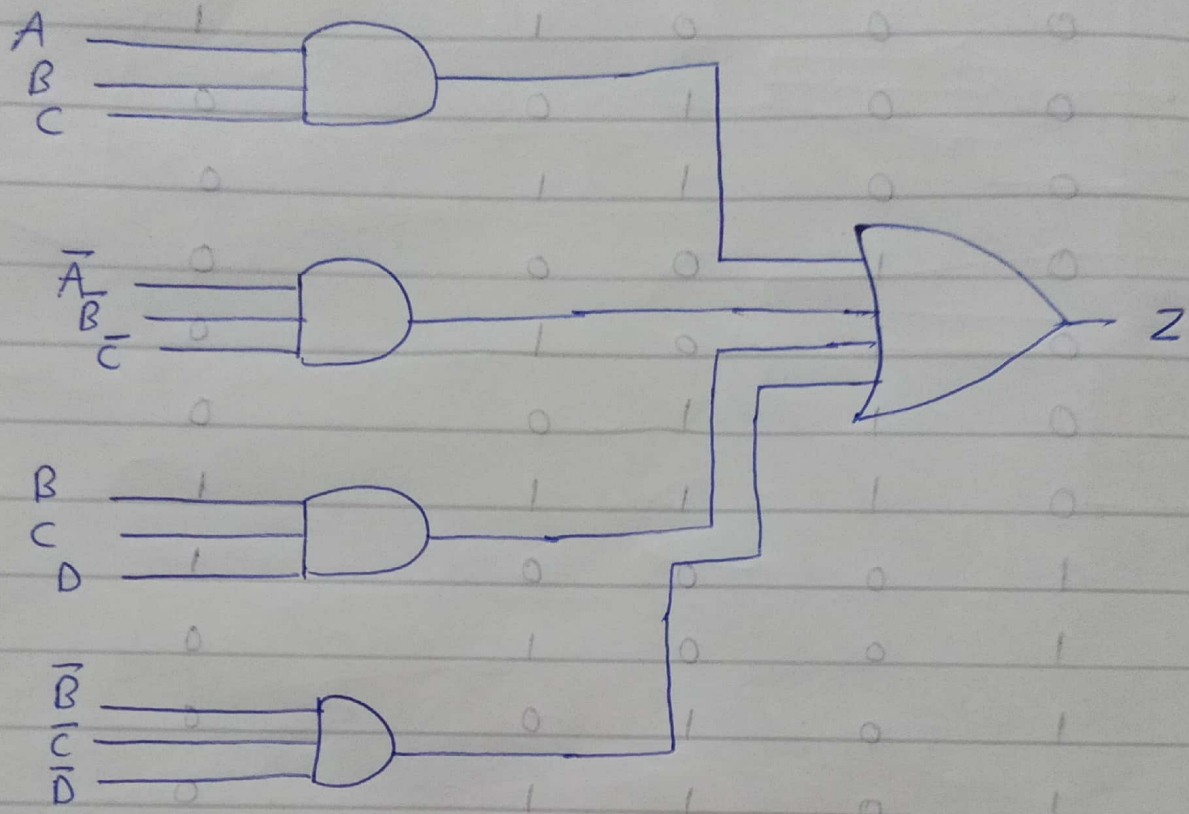
$$SPOS = M_0 M_1 M_2 M_3 M_4$$

$$= (A+B+C)(A+B+\bar{C})(A+\bar{B}+C)(A+\bar{B}+\bar{C})$$
$$(\bar{A}+B+C)$$

(13)

A	B	C	D	Z
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1
1	0	0	0	1
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

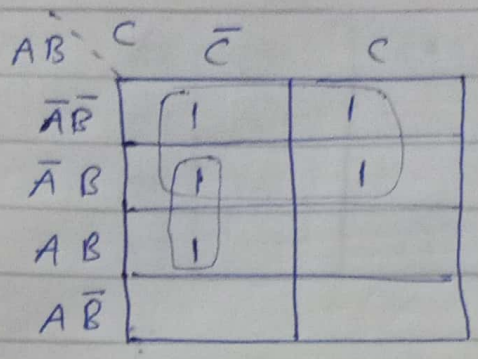




6

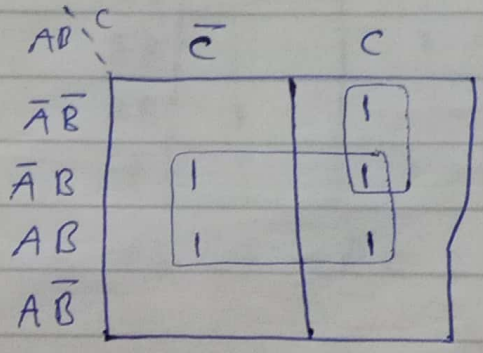
①

a-



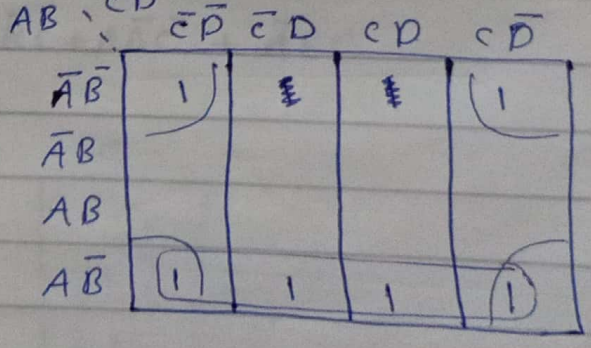
$X = \bar{A} + B\bar{C}$

b-



$Y = B + \bar{A}C$

c-

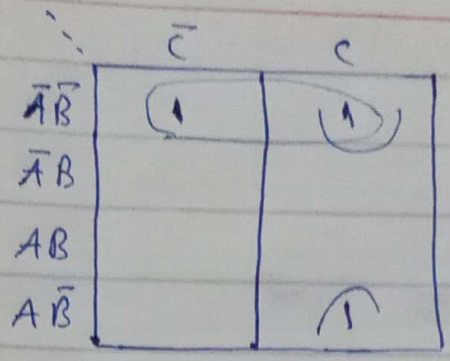


$W = \bar{B}C\bar{D} + \bar{A}B\bar{D} + A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C}\bar{D}$

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

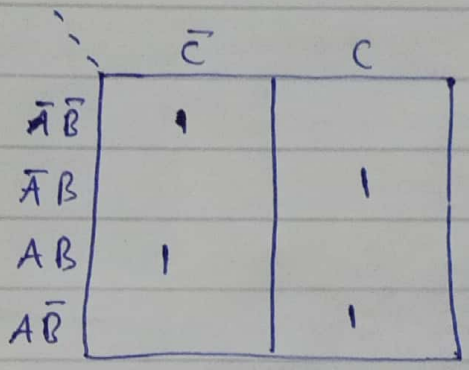
(2)

a-



$\bar{A}\bar{B} + \bar{B}C$

d-

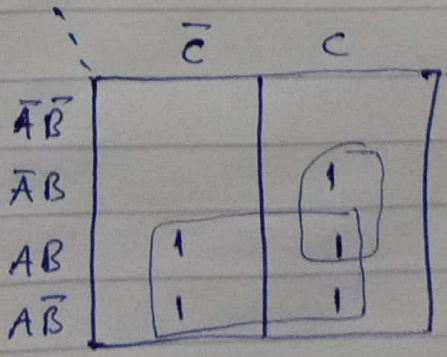


$\bar{A}\bar{B}\bar{C} + \bar{A}BC + AB\bar{C} + A\bar{B}C$

(3)

a- $A(B+\bar{B})(C+\bar{C}) + BC(A+\bar{A})$

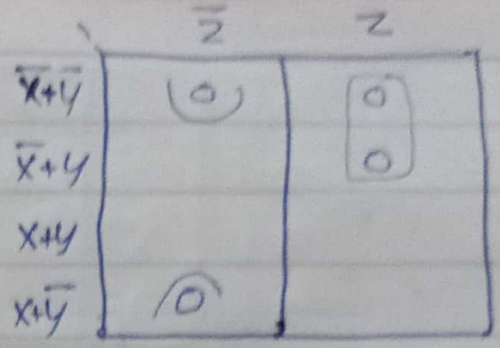
$= ABC + AB\bar{C} + A\bar{B}C + A\bar{B}\bar{C} + \bar{A}BC$



$A + BC$

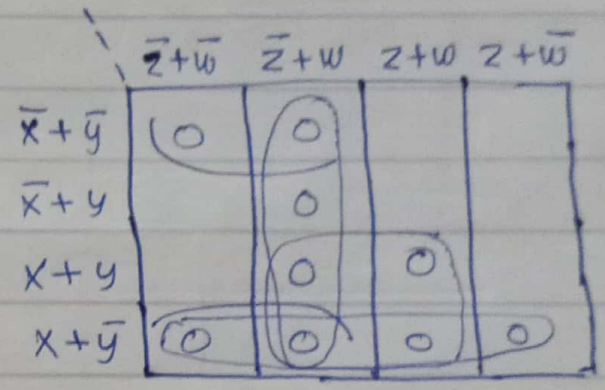
(4)

a -



$(\bar{x}+z)(\bar{y}+\bar{z})$

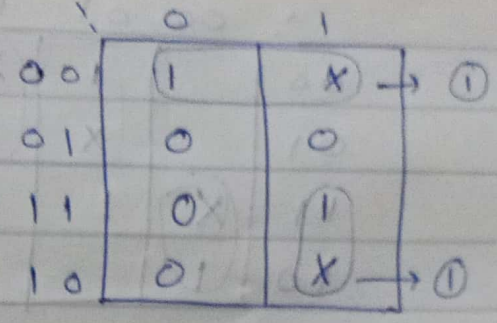
c -



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

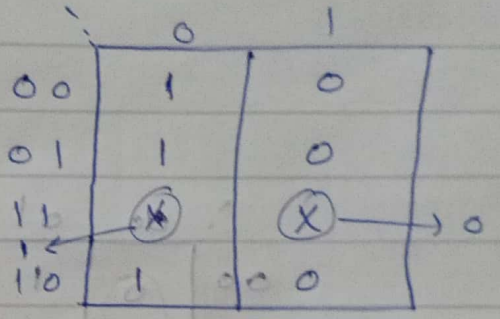
(5)

a- $F_1 =$



$F_1 = \bar{A}\bar{B} + AC$ The Value for $X = 1$

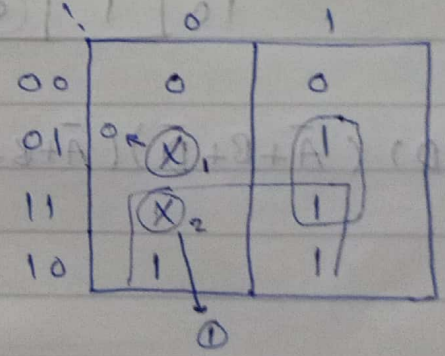
b- $F_2 =$



$F_2 = \bar{C}$

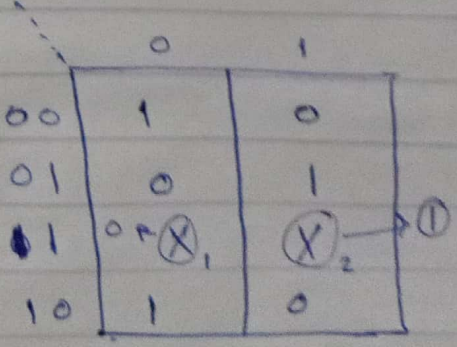
c- $F_3 =$

$X_1 = 0, X_2 = 1$



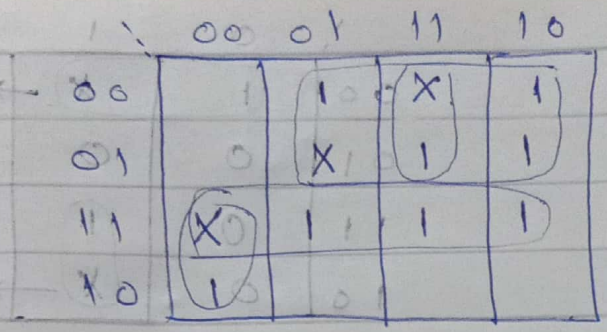
$F_3 = A + BC$

d- $F_4 =$



$F_4 = BC + \bar{B}\bar{C}$

(7)

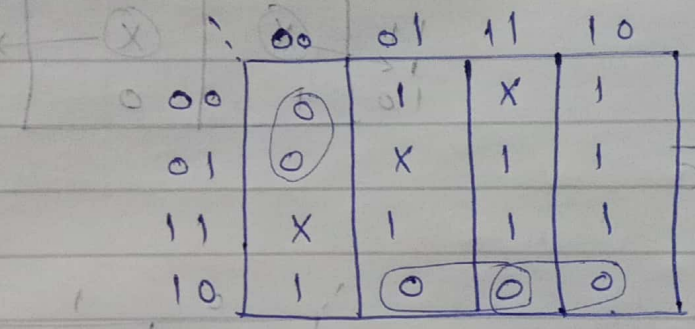


	00	01	11	10
00		1	X	1
01		X	1	1
11	X	1	1	1
10	1			

X = 1

$$AB + \bar{A}D + \bar{A}C + A\bar{C}\bar{D}$$

(8)



	00	01	11	10
00	0	1	X	1
01	0	X	1	1
11	X	1	1	1
10	1	0	0	0

$$(\bar{A}+C+D)(\bar{A}+B+\bar{D})(\bar{A}+B+C)$$