محمدهادی سرمدی (۹۹۴۴۲۱۴۳)

سوال دوم : $F(a,b,c,d) = \prod M(2,3,5,7,8,10,11,12,13) \cdot D(6)$

الف)

ab \ cd	00	01	11	10
00			0	0
01		0	0	~~0~~
11	0	0		
10	0		0	0

PI	EPI
$a+\bar{c}$	$b+\bar{c}$
$b+\bar{c}$	
$a+\bar{b}+\bar{d}$	
$\bar{b}+c+\bar{d}$	
$\bar{a}+\bar{b}+c$	
$\bar{a}+c+d$	
$\bar{a}+b+d$	

-2

-6

$f = (b+\bar{c})(a+\bar{b}+\bar{d})(\bar{a}+\bar{b}+c)(\bar{a}+b+d$

+6

-3 for POS

شکل های ساده شده : SoP

ab \ cd	00	01	11	10
00	1	1		
01	1			
11			1	1
10		1		

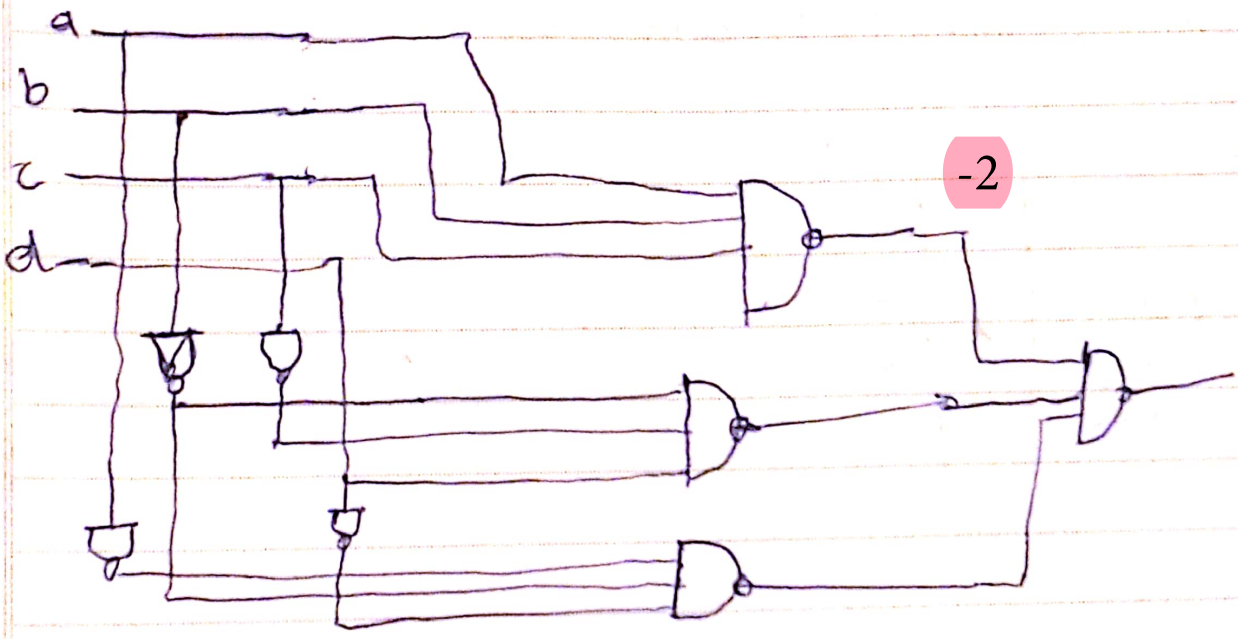
$= F(a,b,c,d) = abc + \bar{b}\bar{c}d + \begin{cases} \bar{a}\bar{c}d \\ \bar{a}b\bar{c} + \bar{a}d \end{cases}$

Subject:
Year: Month: Date:

-1

$f = abc + \bar{b}\bar{c}d + \bar{a}\bar{c}\bar{d}$ & Nand-Nand ↩

+2

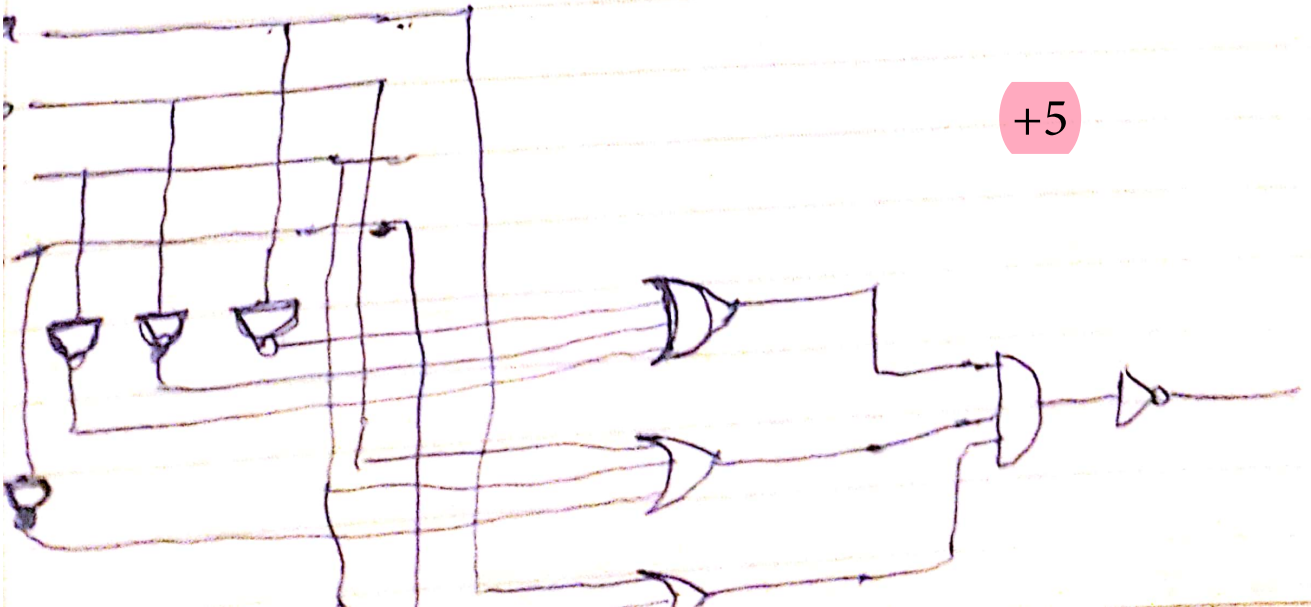


-2

OR-And-INV

$f = (b+\bar{c})(a+\bar{b}+\bar{d})(\bar{a}+\bar{b}+c)(\bar{a}+b+d)$

$\bar{f} = (\bar{a}+b+\bar{c})(b+c+\bar{d})+(a+c+d)$ SoP of $\bar{f}$



+5

Subject:
Year: Month: Date:

$f = \sum m(0,1,3,4,9,13,15) + d(4)$ (2.

0	(0,1) 1
1	(0,2) 2
2	(1,9) 8
4	(2,4) 6
9	(4,12) 8
12	(12,13) 1

+8

$(0,1) \rightarrow \begin{matrix}0000\\0001\end{matrix} \rightarrow \bar{a}\bar{b}\bar{d}$

$(0,2) \rightarrow \begin{matrix}0000\\0100\end{matrix} \rightarrow \bar{a}\bar{c}\bar{d}$

+7

$(1,9) \rightarrow \begin{matrix}0001\\1001\end{matrix} \rightarrow \bar{b}\bar{c}d$

$(2,4) \rightarrow \begin{matrix}0100\\0110\end{matrix} \rightarrow \bar{a}bd$

$(4,12) \rightarrow \begin{matrix}0110\\1110\end{matrix} \rightarrow bc\bar{d}$

$(12,13,15) \rightarrow \begin{matrix}1110\\1111\end{matrix} \rightarrow abc$

p_i \ m_i	0	1	2	9	4	12	13
$\bar{a}\bar{b}\bar{c}$	X	X					
$\bar{a}\bar{c}\bar{d}$	X		X				
$\bar{b}\bar{c}d$		X			X		
$\bar{a}b\bar{d}$			X	X			
$bc\bar{d}$				X		X	
abc						X	X
	X	X	X	dont care	X	X	X

+3

$f = abc + \bar{b}\bar{c}d + \bar{a}\bar{c}\bar{d}$

-2 for wrong F

Subject:
Year: Month: Date:

ه) ۲ns ← یک ورودی
۴ns ← دو ورودی
۷ns ← سه ورودی

با توجه به بخش ها الف و ج ←

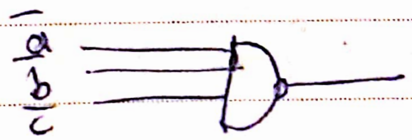
abcd 0000 → abcd 0001

+12

$(۲+۷+۷) - ۴+۷ = ۲ns$

-6 for did not draw gate and path of Hazard

و) با افزودن گیت مرتبط به $\bar{a}\bar{b}\bar{c}$ می توان هازارد را رفع کرد.



+6