جامعة بيرزيت

BIRZEIT UNIVERSITY

ANSWER BOOKLET

Student: Digital Number 10

Course: Department: Number:

Division: PLD "2" Instructor:

Date: Day Month Year

For Instructor's Use

Question	Grade
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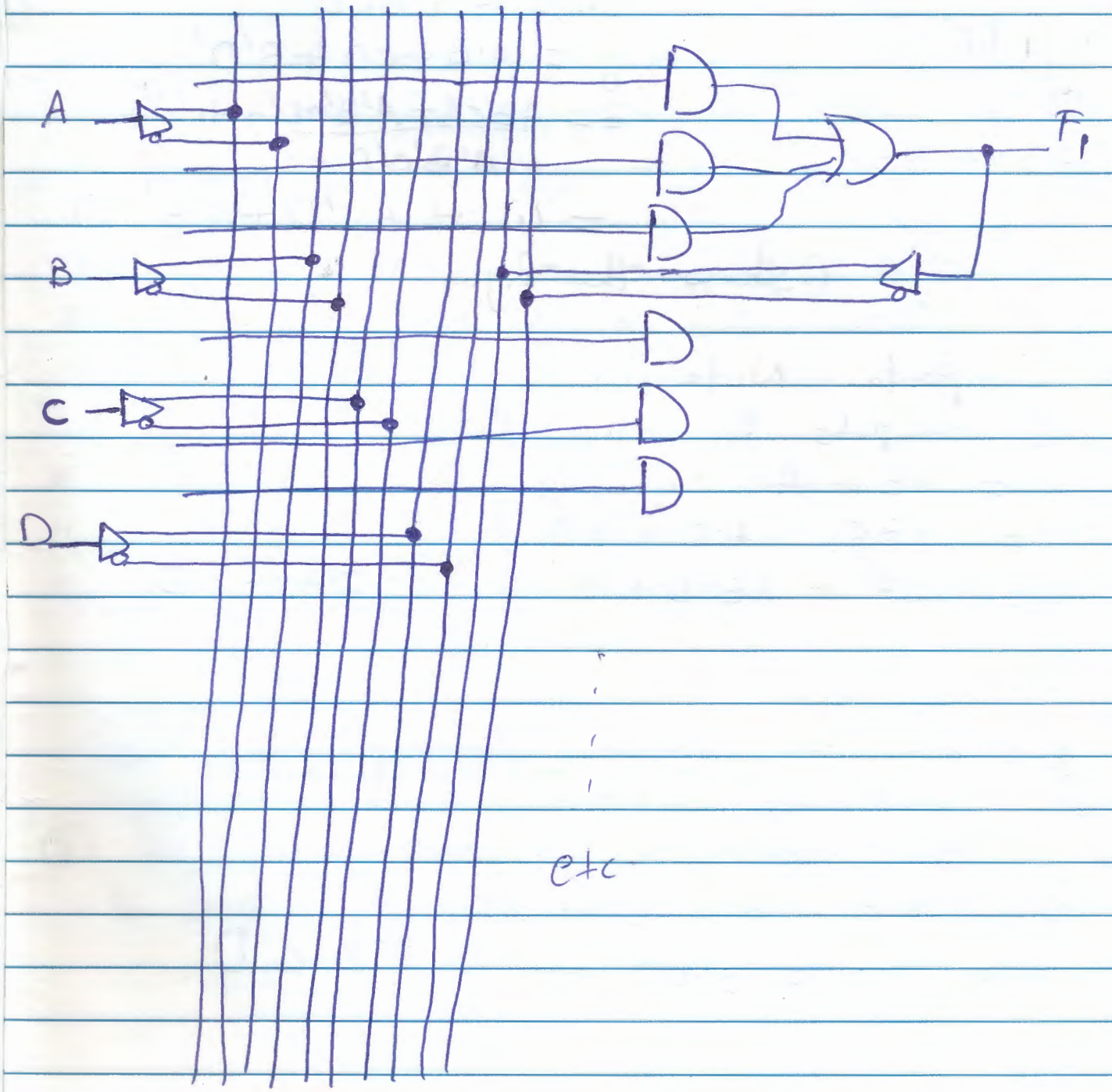
Total	

⊛ PAL

- Fixed OR array and a Programmable AND array.

- Example of PAL with 4 inputs, 4 outputs, 4 sections of a three-wide AND-OR array (3 programmable AND gates in each section and one fixed OR gate).



$w(A,B,C,D) = \Sigma(2,12,13)$

$x(A,B,C,D) = \Sigma(7,8,9,10,11,12,13,14,15)$

$y(A,B,C,D) = \Sigma(0,2,3,4,5,6,7,8,10,11,15)$

$z(A,B,C,D) = \Sigma(1,2,8,12,13)$

AB \ CD	00	01	11	10
00				1
01				
11	1	1		
10				

$w = ABC' + A'B'CD'$

⇒ In the same way :-

$x = A + BCD$

$y = A'B + CD + B'D'$

$z = ABC' + A'B'CD' + AC'D' + A'B'C'D$

$= w + AC'D' + A'B'C'D$

(show the figure)

⊛ Important Note

3 outputs for this Pal

$x = AB + Ac + cD$

$y = A'BC + AcD + BD$

$z = A'B + ABCD + B'CD' + c'D + B'C'D$

x - is ok

y - is ok

z - must be divided such that (for example)

$z = A'B + ABCD + m$

where $m = B'CD' + c'D + B'C'D$

⊛ Programming Table for the previous example:-

product term	AND Inputs A	B	C	D	W	Outputs
1	1	1	0	–	–	$W = ABC' +$
2	0	0	0	0	–	$A'B'CD'$
3	–	–	–	–	–	
4	1	–	–	–	–	$x = A +$
5	–	1	1	1	–	BCD
6	–	–	–	–	–	
7	0	1	–	–	–	$y = A'B +$
8	–	–	1	1	–	$CD +$
9	–	0	–	0	–	$B'D$
10	–	–	–	–	1	$z = w +$
11	1	–	0	0	–	$AC'D' +$
12	0	0	0	1	–	$A'B'C'D$

Ex. ~~If~~ ~~$z = ABC'D + A'B'CD' + A$~~

⊛ for not used AND gate → intact because $A'.A = 0$ (also $B'.B = C'.C \ldots$).