29|10|21 Friday

Complement of a function :-

$$(x+y+z)' = x' \cdot y' \cdot z'$$

x	y	z	x'	y'	z'	x+y+z	(x+y+z)'	x'.y'.z'
0	0	0	1	1	1	0	1	1
0	0	1	1	1	0	1	0	0
0	1	0	1	0	1	1	0	0
0	1	1	1	0	0	1	0	0
1	0	0	0	1	1	1	0	0
1	0	1	0	1	0	1	0	0
1	1	0	0	0	1	1	0	0
1	1	1	0	0	0	1	0	0

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② Find the complement of $F = x'yz' + x'y'z$

$$(x+y'+z)\cdot(x+y+z')$$

$$F' = (x'yz' + x'y'z)'$$

$$= (x'yz')' \cdot (x'y'z)'$$

$$= (x+y'+z)\cdot(x+y+z')$$

$$F' = (x'yz') + (x'y'z))'$$

$$= (x+y'+z)\cdot(x+y+z')$$

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③ Find F' if $F = x(y+z') + y(x+z) + z(x'+y')$

Sol :- $F' = (x'+y'z)\cdot(y'+x'z')\cdot(z'+xy)$

Minterms

| x | y |

AND : $x \cdot y$, $x' \cdot y$, $x \cdot y'$, $x' \cdot y'$

Maxterms

OR : $x+y$, $x'+y$, $x+y'$, $x'+y'$

| x | y | z |

$x'y'z'$, $x'y'z$, $x'yz'$, $x'yz$, $xy'z'$, $xy'z$, xyz', xyz

$x'+y'+z'$, $x'+y'+z$, $x'+y+z'$, $x'+y+z$, $x+y'+z'$, $x+y'+z$, $x+y+z'$, $x+y+z$

Minterm → Standard product (+)

Maxterm → Standard Sums (·)

x	y	Minterms (m_i) Term	Desig.	Maxterms (M_i) Term	Desig.
0	0	$x'y'$	m_0	$x+y$	M_0
0	1	$x'y$	m_1	$x+y'$	M_1
1	0	xy'	m_2	$x'+y$	M_2
1	1	xy	m_3	$x'+y'$	M_3

m_i M_i

11

$1 \times 2^0 = 1$

$1 \times 2^1 = 2$

3

1001

$1 \times 2^0 = 1$

$0 \times 2^1 = 0$

$0 \times 2^2 = 0$

$1 \times 2^3 = 8$

9

1 → 1 4 → 100 8 → 1000

2 → 10 5 → 101 9 → 1001

3 → 11 6 → 110

7 → 111

x	y	z	Minterms (m_j) Term	Desig	Maxterms (M_j) Term	Desig
0	0	0	$x'y'z'$	m_0	$x+y+z$	M_0
0	0	1	$x'y'z$	m_1	$x+y+z'$	M_1
0	1	0	$x'yz'$	m_2	$x+y'+z$	M_2
0	1	1	$x'yz$	m_3	$x+y'+z'$	M_3
1	0	0	$xy'z'$	m_4	$x'+y+z$	M_4
1	0	1	$xy'z$	m_5	$x'+y+z'$	M_5
1	1	0	xyz'	m_6	$x'+y'+z$	M_6
1	1	1	xyz	m_7	$x'+y'+z'$	M_7

m_{11}
$xy'z w$

M_{11}
$x'+y+z'+w'$

x y z w
1 0 1 1

2 | 11
2 | 5 - 1
2 | 2 - 1
1 - 0