Answer 1

$$xy + x'z + yz = xy + x'z + (x+x').yz \quad (x+x' = 1)$$

$$= xy + x'z + (xyz + x'yz)$$

$$= (xy + xyz) + (x'z + x'yz)$$

$$= x'z(1+y) + xy(1+z) \quad (1+y = 1,\ 1+z = 1)$$

$$= xy(1) + x'z(1)$$

$$= xy + x'z$$

$$xy + x'z + yz = xy + x'z$$

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Answer 2

$$(x+y).(x'+z).(y+z) = (x+y).(x'+z)$$

$$\Downarrow$$

$$\big((x.x')+(x.z)+(x'.y)+(y.z)\big).(y+z) = (x+y).(x'+z)$$

$$(x.x'.y)+(x.y.z)+(x.z.y)+(x.z.z)+(x'.y.y)+(x'.y.z)+(y.z.y)+(y.z.z)$$

$$0 \quad 0 \quad xyz \quad xz \quad x'y \quad x'yz \quad yz \quad yz$$

$$\Rightarrow xyz + x'yz + xz + x'y + yz + yz = (x+y).(x'+z)$$

$$\Downarrow$$

$$\Rightarrow yz(x+x') + yz + yz + x'y + xz = (x+y).(x'+z)$$

$$1$$

$$\Rightarrow yz + yz + yz + x'y + xz = (x+y).(x'+z)$$

same

$$\Rightarrow yz + x'y + xz = (x+y).(x'+z)$$

$$(x.x') + (xz) + (x'y).(yz)$$

PROOF

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Answer 3

a)

A	B	C	D	B'D	A'D	BD	F	
0	0	0	0	0	0	0	0	$A+B+C+D \rightarrow M_0$
0	0	0	1	1	1	0	1	$A'B'C'D \rightarrow m_1$
0	0	1	0	0	0	0	0	$A+B+C'+D \rightarrow M_2$
0	0	1	1	1	1	0	1	$A'B'CD \rightarrow m_3$
0	1	0	0	0	0	0	0	$A+B'+C+D \rightarrow M_4$
0	1	0	1	0	1	1	1	$A'BC'D \rightarrow m_5$
0	1	1	0	0	0	0	0	$A+B'+C'+D \rightarrow M_6$
0	1	1	1	0	1	1	1	$A'BCD \rightarrow m_7$
1	0	0	0	0	0	0	0	$A'+B+C+D \rightarrow M_8$
1	0	0	1	1	0	0	1	$AB'C'D \rightarrow m_9$
1	0	1	0	0	0	0	0	$A'+B+C'+D \rightarrow M_{10}$
1	0	1	1	1	0	0	1	$AB'CD \rightarrow m_{11}$
1	1	0	0	0	0	0	0	$A'+B'+C+D \rightarrow M_{12}$
1	1	0	1	0	0	1	1	$ABC'D \rightarrow m_{13}$
1	1	1	0	0	0	0	0	$A'+B'+C'+D \rightarrow M_{14}$
1	1	1	1	0	0	1	1	$ABCD \rightarrow m_{15}$

Sum of minterms

$F(A,B,C,D) = A'B'C'D + A'B'CD + A'BC'D + A'BCD + AB'C'D + AB'CD + ABC'D + ABCD$

$= \Sigma(1,3,5,7,9,11,13,15)$

Product of Maxterms

$F(A,B,C,D) = (A+B+C+D).(A+B+C'+D).(A+B'+C+D).(A+B'+C'+D).(A'+B+C+D).(A'+B+C'+D).$
$(A'+B'+C+D).(A'+B'+C'+D)$

$= \Pi(0,2,4,6,8,10,12,14)$

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answer 3

b) $F(A,B,C,D) = B'D + A'D + BD$

$= (B'D).(C+C') + (A'D).(C+C') + BD.(C+C')$

$= (B'DC) + (B'DC') + (A'DC) + (A'DC') + (BDC) + (BDC')$

$= (B'DC)(A+A') + (B'DC').(A+A') + (A'DC).(B+B') + (A'DC').(B+B') + (BDC)(A+A') +$

$(BDC').(A+A')$

$= (B'DCA) + (B'DCA') + (B'DC'A) + (B'DC'A') + (A'DCB) + (A'DCB') + (A'DC'B) + (A'DC'B') +$

$(BDCA) + (BDCA') + (BDC'A) + (BDC'A')$

$\Sigma(1,3,5,7,9,11,13,15)$

$\sum(1,3,5,7,9,11,13,15) = \Pi(0,2,4,6,8,10,12,14)$

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