Eray ALGIN
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① $F(x,y,z) = xy + x'z + yz$

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

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

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

$= xy + x'z$

② $(x+y)(x'+z)(y+z) = (x+y)(x'+z)$

$\Rightarrow (x+y)(x'+z)(y+z+0) = (x+y)(x'+z)$

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

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

$\Rightarrow (x+y)\underbrace{(1+z)}_{1}(x'+z)\underbrace{(1+y)}_{1} = (x+y)(x'+z)$

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

③ a)

| a | b | c | d | b'd | a'd | bd | F | |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $m_0$ |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 → a'b'c'd | $m_1$ |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | $m_2$ |
| 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 → a'b'cd | $m_3$ |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | $m_4$ |
| 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 → a'bc'd | $m_5$ |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | $m_6$ |
| 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 → a'bcd | $m_7$ |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $m_8$ |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 → ab'c'd | $m_9$ |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | $m_{10}$ |
| 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 → ab'cd | $m_{11}$ |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | $m_{12}$ |
| 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 → abc'd | $m_{13}$ |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | $m_{14}$ |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 → abcd | $m_{15}$ |

$F = a'b'c'd + a'b'cd + a'bc'd + a'bcd + ab'c'd + ab'cd + abc'd + abcd$

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

$\Pi(0,2,4,6,8,10,12,14)$ product of maxterms

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

$= D(\underbrace{B' + A' + B}_{1}) = D(\underbrace{A'+1}_{1}) = D.1 = D$