A) $ab + a'c + bcd = ab + a'c$

سمت چپ : $ab + a'c + bcd + \underbrace{bc}_{\text{Consensus}} = ab + a'c + bc\underbrace{(d+1)}_{1} = ab + a'c + bc = ab + a'c$

B) $(a+b')(b+c')(c+a') = (a'+b)(b'+c)(c'+a)$

طرف چپ $= (a+b')(a'+c)[b'+c](b+c')[a'+b][c'+a] \Rightarrow$

dual consensus

$= (a'+b)(b'+c)(c'+a)$

C) $(abd + a'b + b'd + c')(c + ab + bd) = b(a+c)(a'+c') + d(b+c)$

Consensus: bd ; d

$\Rightarrow$ C) $(d + abd + a'b + c')(c + ab + bd) = (d + a'b + c')(c + ab + bd)$

جذب

$= dc + abd + bd + a'bc + a'bab + a'bd + c'c + abc' + bdc' = cd + bd + a'cb$

$+ ac'b = d(b+c) + b(a'c + ac') \xrightarrow{\text{multiplying out}} d(b+c) + b(a+c)(a'+c')$

distributive

D) $(a+b)'(a+c) + (a+b)(a+c)' = a'(b'c + bc')$

$\xrightarrow{\text{دمورگان}} a'b'(a+c) + a'c'(a+b) \xrightarrow{\text{distributive}} a'b'a + a'b'c + a'c'a + a'c'b$

$\xrightarrow{\text{distributive}} a'(b'c + c'b)$

۲

A	B	C	$f_1(A,B,C)$	f_2	f_3	f_4
0	0	0	0	1	1	0
0	0	1	1	0	1	1
0	1	0	1	1	1	1
0	1	1	1	1	0	0
1	0	0	1	0	1	1
1	0	1	0	1	0	1
1	1	0	1	1	1	1
1	1	1	1	1	1	1

$f_2 = f_3$

$f_1 = f_4$

۳

A) $F(w,x,y,z) = \sum m(7,10,13,14,15)$

$= w'xyz + wx'yz' + wxy'z + wxyz' + wxyz \Longrightarrow$ SOP از

$\rightarrow F(w,x,y,z) = \sum M(0,1,2,3,4,5,6,8,9,11,12)$

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

B) $F(w,x,y,z) = \prod M(1,2,4,9,11)$

$= (w+x+y+z')(w+x+y'+z)(w+x'+y+z)(w'+x+y+z)(w'+x+y'+z) \Longrightarrow$ POS از

$= \sum m(0,3,5,6,7,8,10,12,13,14,15) \Longrightarrow$ SOP از

C) $F(a,b,c,d) = \sum m(0,1,4,5,8,12,14,15)$

$= w'x'y'z' + w'x'y'z + wx'y'z' + wx'y'z + wxyz' + wxyz \Longrightarrow$ SOP از

$= \prod M(2,3,6,7,9,10,11,13)$

۴

A	B	C	D	F(A,B,C,D)
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

۵-

A) $((AC')'\cdot B)' + (A'+B+C)'$

B) $(((A'B)'+D)(B+C)')'$

۶- هنگام صندوق جا به جا شود و کلید بسته باشد ⇐ $AB'=1$

درب بانک پس از ساعت مقرر باز باشد ⇐ $D'C'=1$

درب بانک و کلید کنترل همزمان باز باشد ⇐ $D'A'=1$

$AB'+D'C'+D'A'$ ⇒ معادله