(IV)

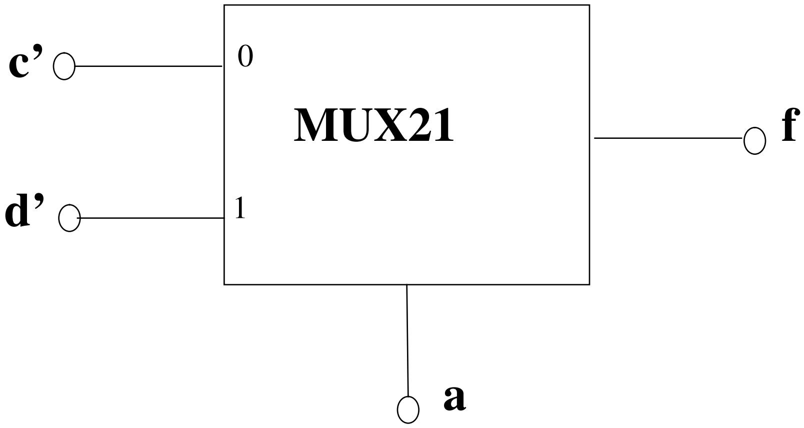
a \ bcd	000	001	011	010	110	111	101	100	
0	1	-	0	-	0	0	1	1	L0
1	0	1	-	0	0	1	1	0	L1

b \ cd	00	01	11	10
0	1	-	0	-
1	1	1	0	0

L0=C’

b \ cd	00	01	11	10
0	0	1	-	0
1	0	1	1	0

L1=d



CSE140B Midterm Solution

(I) f=cd’+a’bc’+a’c’d or f=cd’+a’bd’+a’c’d

(II)

id	a	b	c	d
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
4	0	1	0	0
5	0	1	0	1
9	1	0	0	1
7	0	1	1	1
15	1	1	1	1

id	a	b	c	d
0,1	0	0	0	-
0,2	0	0	-	0
0,4	0	-	0	0
1,5	0	-	0	1
1,9	-	0	0	1
4,5	0	1	0	-
5,7	0	1	-	1
7,15	-	1	1	1

id	a	b	c	d
0,1,4,5	0	-	0	-
0,2	0	0	-	0
1,9	-	0	0	1
5,7	0	1	-	1
7,15	-	1	1	1

Prime Implicant Chart

PI’s	0	1	2	7	9	15	4	5
0,1,4,5	X	X					X	X
0,2	X		Ⓧ					
1,9		X			Ⓧ			
5,7				X				X
7,15				X		Ⓧ		

f=a’b’d’+b’c’d+bcd

(III)

$f(0, b, c) = 0 \oplus 0 \oplus b \oplus 1 = b'$

$f(1, b, c) = (1 \oplus b') \oplus 1 \oplus (c \oplus b') = ((b' + c) \oplus b')$

$f(1, 0, c)) = 1 \oplus 1 = 0$

$f(1, 1, c)) = 0 \oplus c = c$

$\therefore f(a, b, c)) = a'b' + abc$