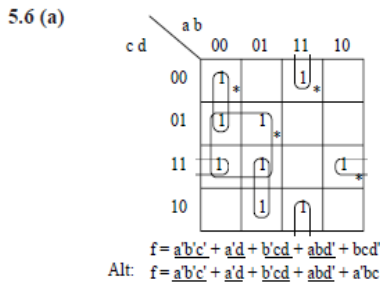
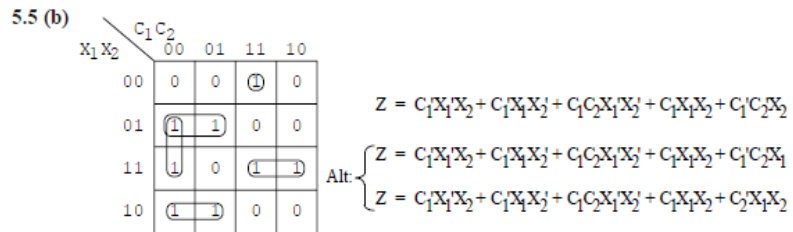
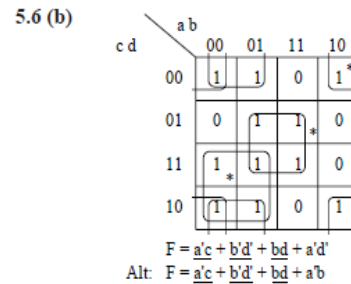


5.5 (a) See FLD p. 697 for solution.



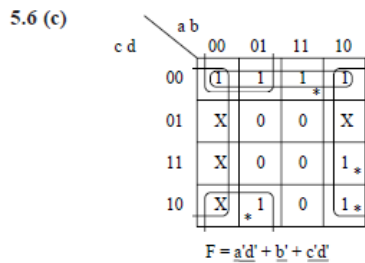
(*) Indicates a minterm that makes the corresponding prime implicant essential.

$a'd \rightarrow m_5$; $a'b'c' \rightarrow m_0$; $b'cd \rightarrow m_{11}$; $abd' \rightarrow m_{12}$



(*) Indicates a minterm that makes the corresponding prime implicant essential.

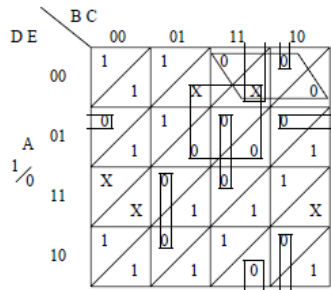
$bd \rightarrow m_{13}$ or m_{15} ; $a'c \rightarrow m_3$; $b'd' \rightarrow m_8$ or m_{10}



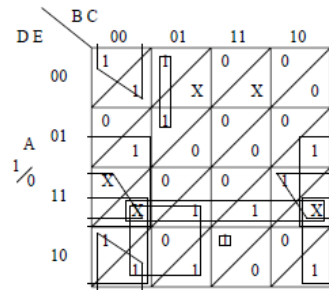
(*) Indicates a minterm that makes the corresponding prime implicant essential.

$c'd' \rightarrow m_{12}$; $a'd' \rightarrow m_0$; $b' \rightarrow m_{10}$ or m_{11}

5.9 (a)

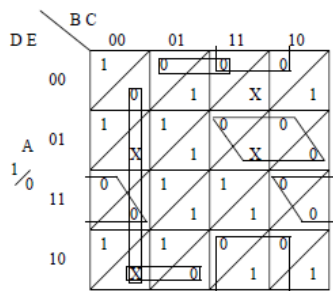


$$F = (A'+B'+C+E)(A'+B+C'+D')(A+B'+C'+E) \\ (B'+D+E)(A+C+D)(A+C+D+E)(A+B'+C'+E)$$

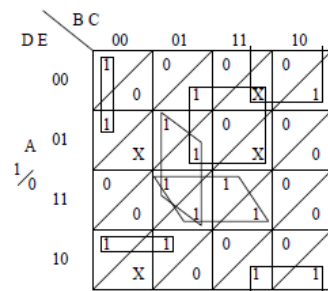


$$F = A'CE + A'CD + A'DE + A'BC'D' + CDE \\ + ABCDE' + B'CE' + ABD \\ \text{Alt: } F = A'CE + A'CD + A'DE + A'BC'D' + CDE \\ + ABCDE' + B'CE' + ABE'$$

5.9 (b)

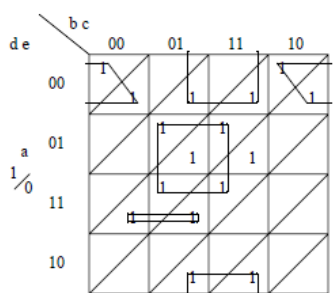


$$F = (A'+B'+E)(A'+C'+D+E)(C+D'+E) \\ (A+B+D'+E)(A+B+C)(B'+D+E)$$



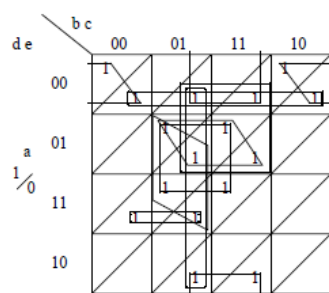
$$F = A'CD' + ABE' + CDE + A'BC'D' + ABDE' + B'CE \\ \text{Alt: } \begin{cases} F = A'CD' + ABE' + CDE + A'BC'E' + A'BCD + B'DE \\ F = A'CD' + ABE' + CDE + A'BC'D' + A'BDE' + B'DE \\ F = A'CD' + ABE' + CDE + A'BC'E' + ABDE' + B'DE \end{cases}$$

5.10 (a)



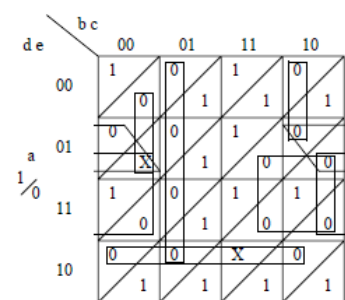
Essential prime implicants: $c'd'e'$ (m_{16}, m_{24}),
 $a'ce'$ (m_{14}), ace (m_{31}), $a'b'de$ (m_3)

5.10 (b)



Prime implicants: $a'b'de$, $a'd'e'$, $cd'e$, $a'ce'$, ace ,
 $a'b'c$, $b'ce$, $c'd'e'$, $a'cd'$

5.11



$$f = (a'+b+c)(a'+d+e)(a+b'+e)(a+c+e) \\ (a+b+c+d)(a'+b'+c+d)(c+d+e) \\ \text{Alt: } f = (a'+b+c)(a'+d+e)(a+b'+e)(a+c+e) \\ (a+b+c+d)(a'+b'+c+e)(c+d+e)$$

5.17 (c)

		A B			
		00	01	11	10
C D	00	1	0	0	0
	01	1	0	0	0
	11	1	0	1	0
	10	1	1	1	1

$$F = (B+C)(A+B+D)(A+C)(A+B+D)$$

5.18 (a) & (b)

		A B			
		00	01	11	10
C D	00	1	1	0	0
	01	1	1	1	1
	11	1	1	0	0
	10	1	1	0	1

$$F = A' + C'D + B'CD'$$

5.18 (c)

		A B			
		00	01	11	10
C D	00	1	1	0	0
	01	1	1	1	1
	11	1	1	0	0
	10	1	1	0	1

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

$$\text{Alt: } F = (A'+C+D)(A'+C'+D)(A'+B'+C')$$

5.19 (a)

		$C_1 C_2 X_1 X_2$	Z
		0 0 0 0	0
		0 0 0 1	0
		0 0 1 0	0
		0 0 1 1	1
		0 1 0 0	0
		0 1 0 1	1
		0 1 1 0	1
		0 1 1 1	0
		1 0 0 0	1
		1 0 0 1	1
		1 0 1 0	0
		1 0 1 1	1
		1 1 0 0	1
		1 1 0 1	0
		1 1 1 0	0
		1 1 1 1	1

5.19 (b)

		$C_1 C_2$			
		00	01	11	10
$X_1 X_2$	00	0	0	1	1
	01	0	1	0	1
	11	1	0	1	1
	10	0	1	0	0

$$F = (C_1 + C_2 + X_1)(C_1 + X_1 + X_2)(C_1 + C_2 + X_1 + X_2)$$

$$(C_1 + C_2 + X_1 + X_2)(C_1 + X_1 + X_2) \left\{ \begin{array}{l} (C_2 + C_2 + X_2) \\ \text{or} \\ (C_2 + X_1 + X_2) \end{array} \right\}$$

5.20 (a)

		a	
		0	1
b c	00	1	
	01	1	1
	11		1
	10	1	1

$$F = a'c' + b'c + ab \text{ or } a'b' + bc' + ac$$

5.20 (b)

		d	
		0	1
e f	00	X	1
	01	1	
	11		X
	10	X	1

$$g = d'e' + f'$$

5.20 (c)

		p	
		0	1
q r	00	1	1
	01	1	
	11	1	1
	10		1

$$F = p'r + q'r + pq \text{ or } p'q' + pr' + qr$$

5.20 (d)

		s	
		0	1
t u	00	X	
	01	1	X
	11	1	X
	10	1	

$$F = s'$$

5.20 (e)

		a	
		0	1
b c	00	1	
	01	1	1
	11		1
	10		1

$$f = a'b' + ab + b'c \text{ or } a'b' + ab + ac$$

5.20 (f)

		D	
		0	1
E F	00	X	
	01	1	X
	11	X	
	10		1

$$G = DEF' + DE'$$

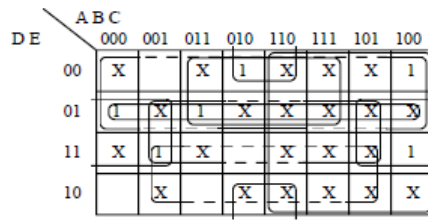
$$G = DEF' + DF$$

$$G = DEF' + EF$$

5.35 (a), 5-variable mirror image map

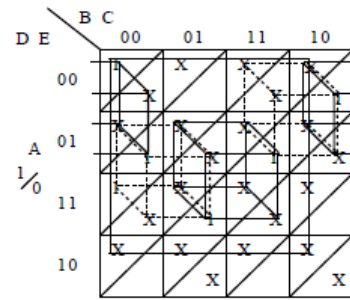
(b) &

(c)



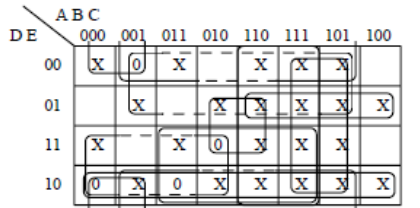
PIs: A, CD', BE, CE, BD', DE, B'CE, B'CD
 $F = A + BE + BD'$ or
 $= A + CD' + CE$

5-variable diagonal map



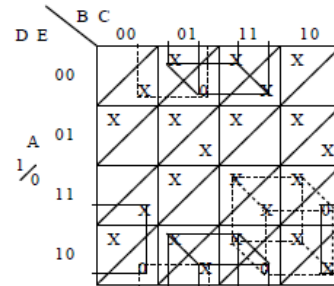
5.35 (d), 5-variable mirror image map

& (e)



PIs: (A+B), (A+C), (A+D+E), (B'D'), (B'+C+E),
 (C+E), (D'+E), (B+C+D), (A-C+D), (A-B+E)
 $F = (B'D')(A+B+E)$ or
 $= (C+E)(A+C+D)$

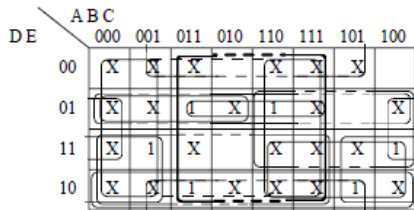
5-variable diagonal map



5.36 (a), 5-variable mirror image map

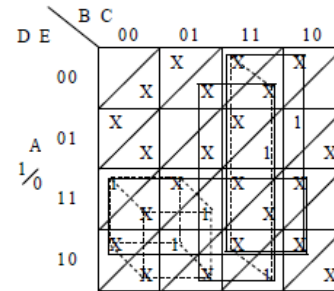
(b) &

(c)



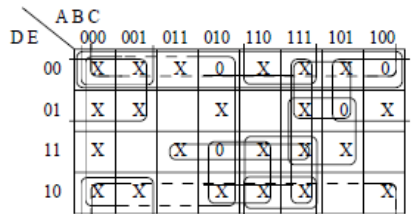
PIs: AB, AD, ACE, BC, BDE, CD, DE, CE,
 AC, BD, CDE, ADE, BCE, AB
 $F = A'C + BD + AB$ or
 $= B'D + AB + BC$ or
 $= A'C + AB + AD$

5-variable diagonal map



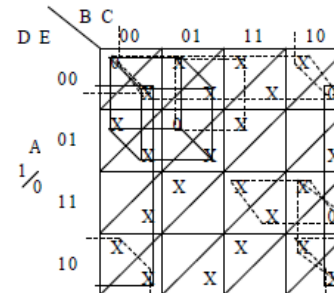
5.36 (d), 5-variable mirror image map

(e)

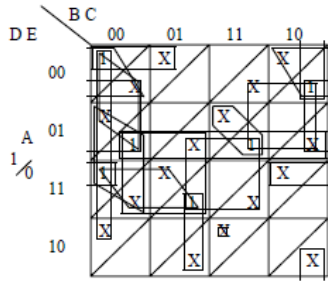


PIs: (A+B+C), (A+B'D), (A+B+E), (A+C+E),
 (A+C+D), (B'D+E), (B'+C+D), (D+E),
 (A+B+E), (A+C), (B+D), (C+E)
 $F = (A+C)(B+D)$

5-variable diagonal map



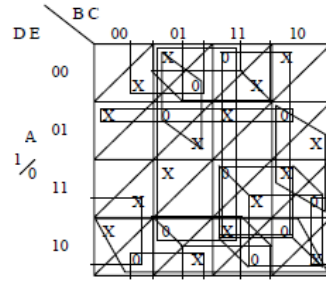
5.37 (a),
(b) &
(c)



PIs: $ABCDE, BC'DE, AC'DE, AB'DE, ABC',$
 $AB'CE, ABD', ABC'D, ADE, A'CE, B'DE, ABE,$
 $B'CE, C'DE, A'CD, B'CD'$

$F = ABE + ABD' + ABC'$ or
 $= A'CD' + A'CE + A'BC'$ or
 $= A'DE + B'DE + C'DE'$ or
 $= ABD' + B'CD' + B'DE$ or
 $= A'CE + B'CE + C'DE'$

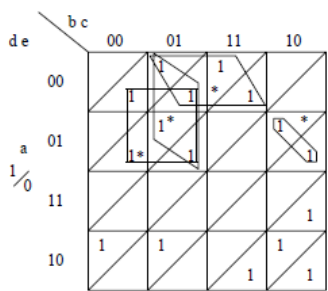
5.37 (d),
& (e)



PIs: $(B' + C + E), (C' + E), (D' + E), (A' + D + E),$
 $(A' + C), (B' + D), (A' + B), (A + C + D), (A + B + E)$

$F = (A' + D + E)(C' + E)(D' + E)(B' + D)$ or
 $= (A + B + E)(B' + D)(A' + B)(A' + C)$ or
 $= (A + C + D)(C + E)(A' + B)(A' + C)$ or
 $= (B + C + D)(D' + E)(B' + D)(A' + B)$ or
 $= (B' + C + E)(C + E)(D' + E)(A' + C)$

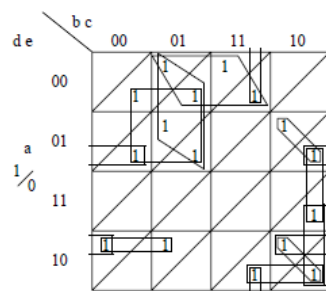
5.38 (a)



(*) Indicates a minterm that makes the corresponding prime implicant essential.

$a'b'd' \rightarrow m_1; cd'e' \rightarrow m_{23}; bc'd'e \rightarrow m_{25}; b'cd' \rightarrow m_{21}$

5.38 (b)



$a'b'd', cd'e', bc'd'e, b'cd', ac'de', ab'ce', ab'de', a'c'de,$
 $a'bc'e, a'bc'd, bc'de', a'bde', a'bce'$