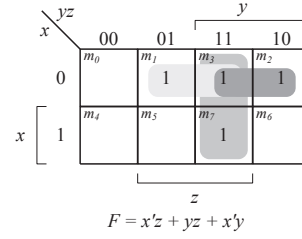
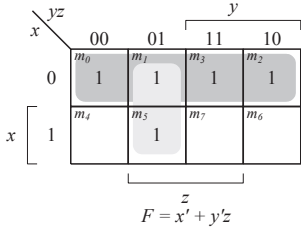
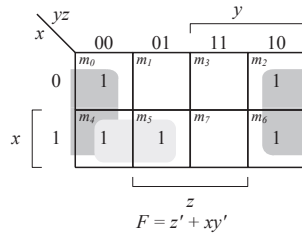
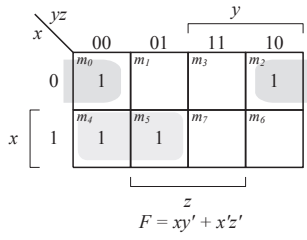
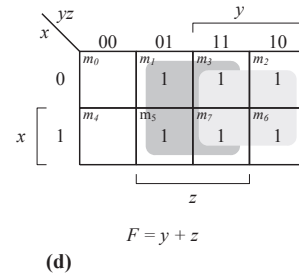
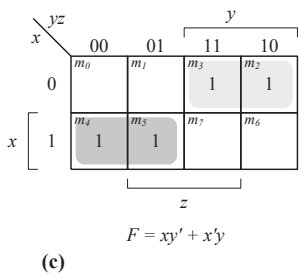
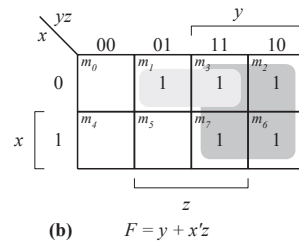
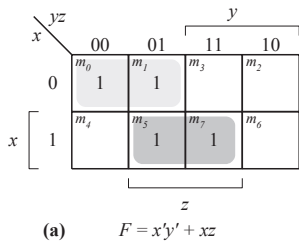


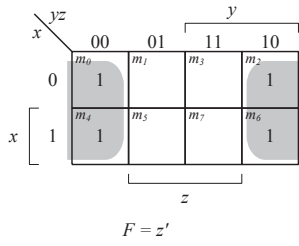
Chapter 3

3.1

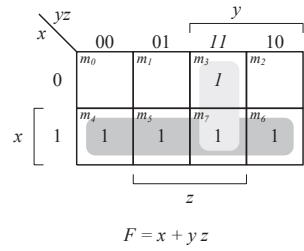


3.2



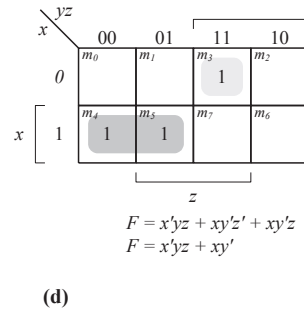
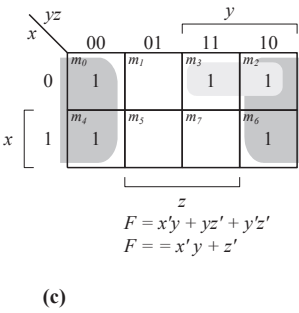
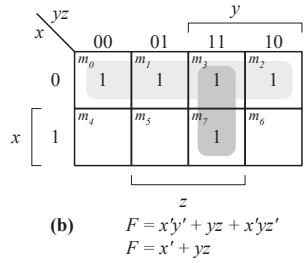
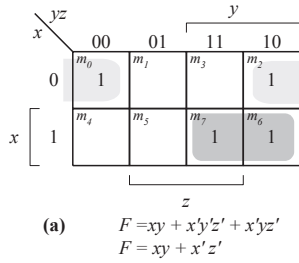


(e)

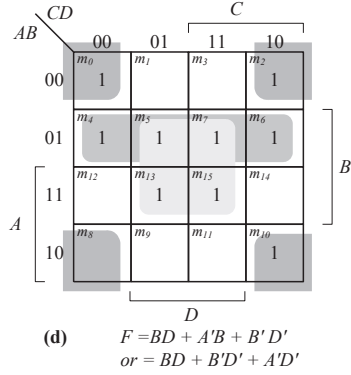
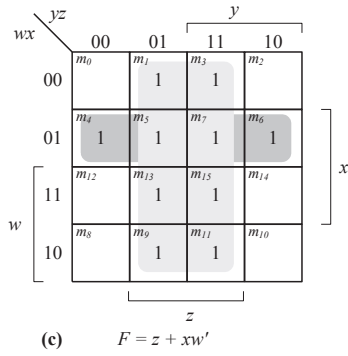
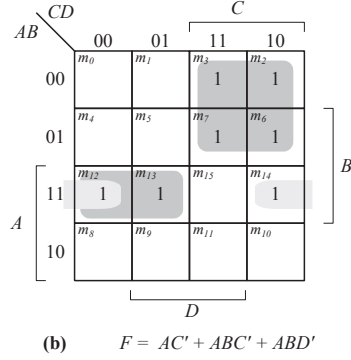
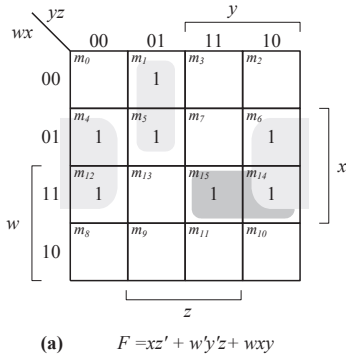


(f)

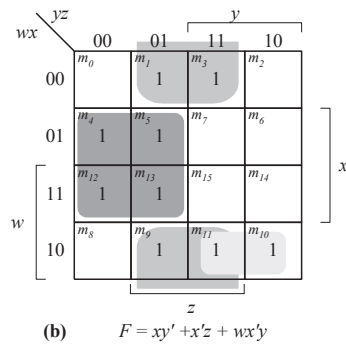
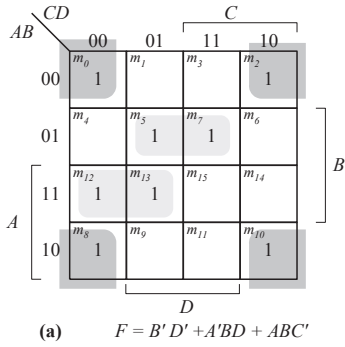
3.3

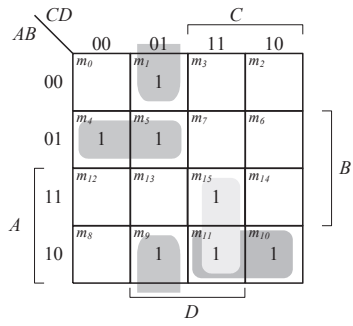


3.5

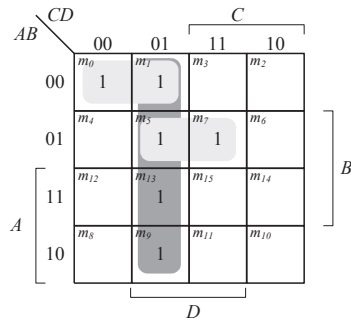


3.6



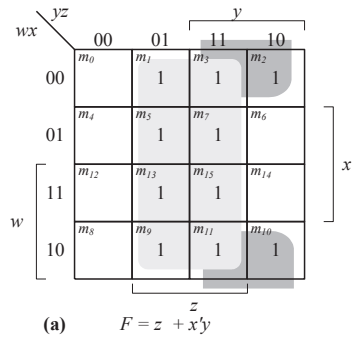


(c)  $F = A'BC' + B'C'D + ACD + AB'C$

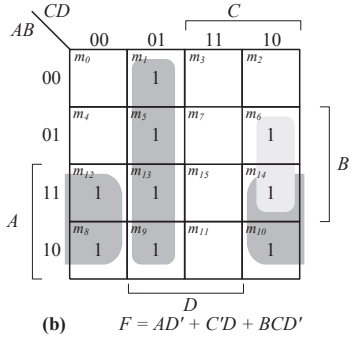


(d)  $F = C'D + A'BD + A'BC'$

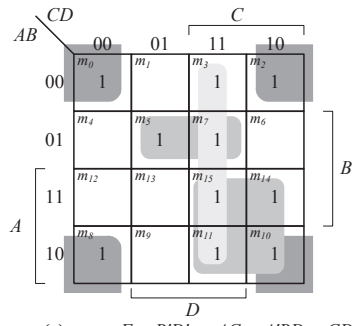
3.7



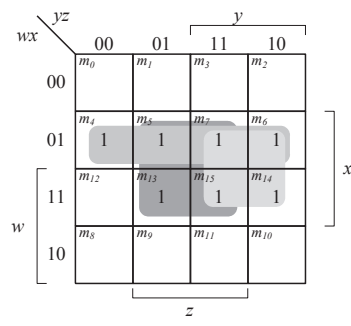
(a)  $F = z + x'y$



(b)  $F = AD' + C'D + BCD'$



(c)  $F = B'D' + AC + A'BD + CD$  (or  $B'C$ )



(d)  $F = xw' + xz + xy$

3.8

(a)  $F(x, y, z) = \Sigma(3, 5, 6, 7)$

		y			
		00	01	11	10
x	yz	$m_0$	$m_1$	$m_3$	$m_2$
	0	1	1	1	1
1	z	$m_4$	$m_5$	$m_7$	$m_6$
		1	1	1	1

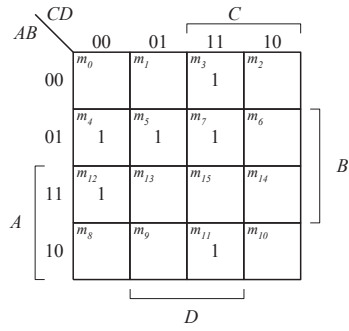
(b)  $F = \Sigma(1, 3, 5, 9, 12, 13, 14)$

		C			
		00	01	11	10
AB	CD	$m_0$	$m_1$	$m_3$	$m_2$
	00	1	1	1	1
	B	$m_4$	$m_5$	$m_7$	$m_6$
		1	1	1	1
A	D	$m_{12}$	$m_{13}$	$m_{15}$	$m_{14}$
	11	1	1	1	1
	D	$m_8$	$m_9$	$m_{11}$	$m_{10}$
		1	1	1	1

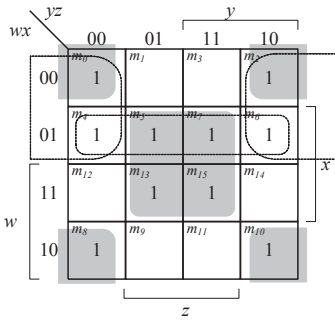
(c)  $F = \Sigma(0, 1, 2, 3, 11, 12, 14, 15)$

		y			
		00	01	11	10
wx	yz	$m_0$	$m_1$	$m_3$	$m_2$
	00	1	1	1	1
	x	$m_4$	$m_5$	$m_7$	$m_6$
		1	1	1	1
w	z	$m_{12}$	$m_{13}$	$m_{15}$	$m_{14}$
	11	1	1	1	1
	z	$m_8$	$m_9$	$m_{11}$	$m_{10}$
		1	1	1	1

(d)  $F = \Sigma(3, 4, 5, 7, 11, 12)$

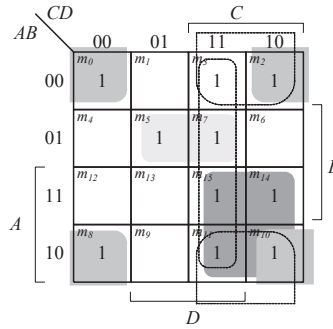


3.9



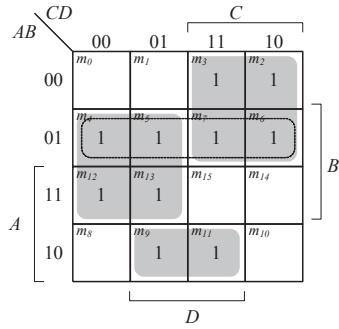
(a)

**Essential:**  $xz, x'z'$   
**Non-essential:**  $w'x, w'z'$   
 $F = xz + x'z' + (w'x \text{ or } w'z')$

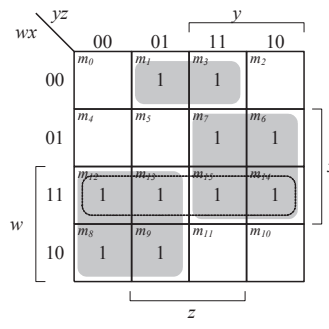


(b)

**Essential:**  $B'D', AC, A'BD$   
**Non-essential:**  $CD, B'C$   
 $F = B'D' + AC + A'BD + (CD \text{ OR } B'C)$

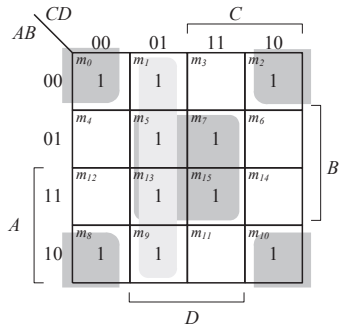


(c)

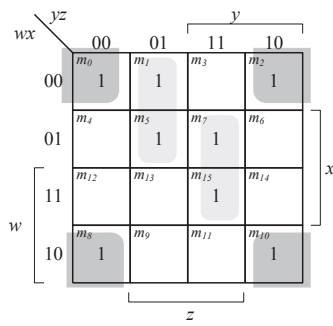


(d)

**Essential:**  $BC', AC, A'B'D$   
**Non-Essential:**  $A'B$   
 $F = BC' + AC + A'B'D$



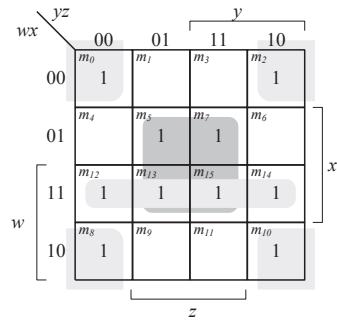
**Essential:**  $wy', xy, w'x'z$   
 $F = wy' + xy + w'x'z$



**Essential:**  $BD, B'C', C'D$   
 $F = BD + B'C' + C'D$

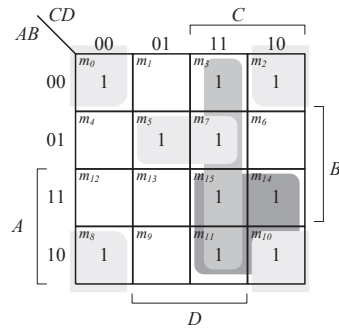
**Essential:**  $x'z', w'y'z, xyz$   
 $F = x'z' + w'y'z + xyz$

3.10



$F = \Sigma(0, 2, 5, 7, 8, 10, 12, 13, 14, 15)$   
**Essential:**  $xz, wx, x'z'$   
 $F = xz + wx + x'z'$

(a)



$F = \Sigma(0, 2, 3, 5, 7, 8, 10, 11, 14, 15)$   
**Essential:**  $AC, B'D', CD, A'BD$   
 $F = AC + B'D' + CD + A'BD$

(b)

3.12

(a)

$$F = \Pi(1, 3, 5, 7, 13, 15)$$

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

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

$$F = C'D' + AB' + CD'$$

		CD			
		00	01	C	
A	00	$m_0$	$m_1$	$m_3$	$m_2$
	01	$m_4$	0	0	$m_6$
	11	$m_{12}$	$m_{13}$	$m_{15}$	$m_{14}$
	10	$m_8$	$m_9$	$m_{11}$	$m_{10}$
		D			

(b)

$$F = \Pi(1, 3, 6, 9, 11, 12, 14)$$

$$F' = B'D + BCD' + ABD'$$

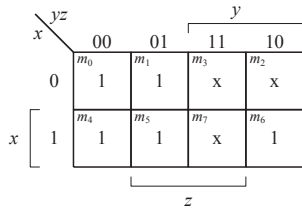
$$F = (B + D)(B' + C' + D)(A' + B' + D)$$

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

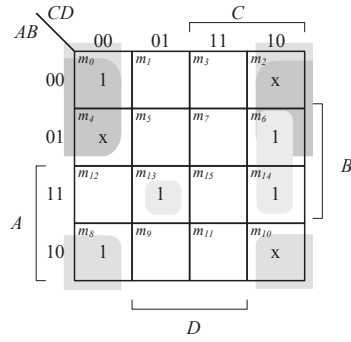
		CD			
		00	01	C	
A	00	$m_0$	0	0	$m_2$
	01	$m_4$	$m_5$	$m_7$	$m_6$
	11	$m_{12}$	$m_{13}$	$m_{15}$	$m_{14}$
	10	$m_8$	$m_9$	$m_{11}$	$m_{10}$
		D			



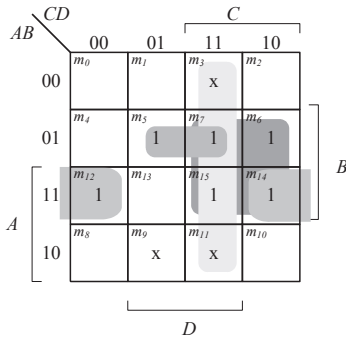
3.15



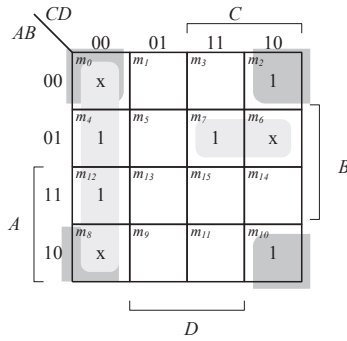
$F = 1$   
 $F = \Sigma(0,1, 2, 3, 4, 5, 6, 7)$



$F = A'D' + B'D' + BCD' + ABC'D$   
 $F = \Sigma(0, 2, 4, 6, 8, 10, 13, 14)$

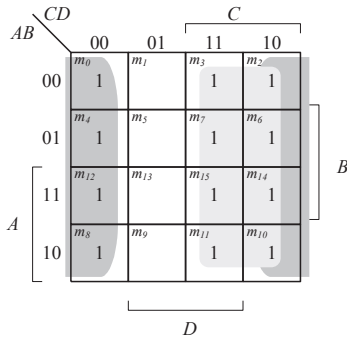


$F = BC + CD + ABD' + A'BD$   
 $F = \Sigma(3, 5, 6, 7, 11, 12, 14, 15)$



$F = B'D' + C'D' + A'BC$   
 $F = \Sigma(0, 2, 4, 6, 7, 8, 10, 12)$

3.16 (a)



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

